

HORTICULTURAL ABSTRACTS

Vol. XII

December 1942

No. 4

Abstracts 1216, 1478 and 1502 are printed by courtesy of the Editors of *Biological Abstracts*. The initialled review is by W. S. Rogers of the East Malling Research Station.

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MISCELLANEOUS.

General.

1165. ANON. 63(411)
Scottish agriculture in wartime.
Scot. J. Agric., 1942, 24: 24-38.
 A continuation of a series published at 6-monthly intervals from January, 1941 (*Ibidem*, Vol. 23, Nos. 2, 3 and 4).

1166. TRIPP, E. H. 63(71+94+931+68.01)
Agriculture in the Dominions.
Scot. J. Agric., 1942, 24: 1-9.
 An account of agricultural conditions in the British Dominions. Each country is dealt with separately in a short review.

1167. ORR, J. B., AND SIMPSON, W. L. 63(73)
Agriculture in U.S.A.
Scot. J. Agric., 1942, 24: 9-14.
 Among the subjects briefly dealt with are: the effect on agriculture of the 1914-18 war and of the economic crises of 1929, the effect of the "new deal" and its application to war conditions, farm production for victory, inducements to farmers, and post-war agriculture.

1168. RUSSELL, E. J. 63(476)
Agriculture in European Russia.
Scot. J. Agric., 1942, 24: 14-24, bibl. 2.
 The organization and present position of agriculture in Russia.

1169. NATIVIDADE, J. V. 63A.985.5
Dez anos de estudo do sobreiro. (Ten years study of the cork tree.)
Rev. agron. Lisboa, 1941/2, 29: 150-64, bibl. 34.
 The work of the *Estação do Sobreiro*, the cork research station of Portugal, during the past ten years, i.e. since its establishment, is reviewed, and interesting problems connected with the cork oak are outlined. The programme laid down for the first years is as follows: 1. To discover reasons for the decline in cork quality of the Portuguese trees and to reduce or stop it. 2. To establish a scientific basis for the regulation of the more important cultural

operations. 3. To study the potentialities of the tree, its relations to environment and to determine the technical conditions by which cultivation may be extended and the cork output of the country increased. A good deal of useful cytological and physiological work has been accomplished. Some of the results are briefly outlined.

1170. SHUTTLEWORTH, S. G. 63A.973.737
The story of wattle (or mimosa).
Sci. Bull. S. Afr. Dep. Agric. 168 (*Division Chemical Services*, No. 168), 1941, pp. 28, bibl. 32.
 Wattle was introduced into South Africa from Australia and tests showed that the black wattle best suited the tanners' needs, with the result that this type was adopted for cultivation. Its acreage rose from some 150,000 in 1910 to over 550,000 in 1939, and the value of wattle bark and extract exports rose from nil in 1910 to some £1,600,000 in 1940. On the silvicultural side the Forestry Department, the Division of Entomology and the pathologists have all been hard at work, while the chemists are carrying out fundamental research on wattle tannin. The problems attacked include the possible correlations, seed selection and value of wattle, soil preparation and wattle-tanned leather, optimum felling and stripping, extraction, improvement of extract, blending methods, provision of special extracts for different types of leather. The chemical composition of wattle is considered in this paper as also are its colour factor, astringency, rate of penetration, and tannin yield compared with that of other sources, the blending of wattle and its best method of use. The research policy of the wattle growers gives good promise for the future.

1171. WADDINGTON, C. H. 57: 63
Some biological discoveries of practical importance.
Nature, 1942, 150: 257-60.
 Among the discoveries reviewed in botany and agriculture are the treatment of straw with caustic alkali to render it digestible to cattle, the technical problem of rendering grass protein fit for human food, hydroponics, plant

hormones, vernalization, plant mentors, various aspects of plant breeding, especially the introduction of new hereditary material and the technique of artificially doubling the number of chromosomes in hybrids, the hybridizing of yeast.

1172. SIEVERS, A. 016: 63
Schrifttum zur Landwirtschaftsgeographie. (A bibliography of articles and books dealing with agriculture in different parts of the world in the last ten years.)

Forschungsdienst, 1942, 24: 205-48.

In compiling this bibliographer's treat, issued under the auspices of the Institut für Agrarwesen und Agrarpolitik, Berlin University, the author has provided a work which should be of great reference value to the librarian when hard pressed by an enquiry on agriculture in Lapland, vegetable growing in North-West France, cacao in Brazil or the like. Even knowing that the book is written by a German for Germans, it is surprising, almost alarming, to note the prevalence of German-written articles. Thus even out of the 31 on Great Britain 6 are in German, while all three on Egypt are also in that tongue.

- 1173. OPPENHEIMER, H. R. 581.144.2
Root cushions, root stalagmites and similar structures.

Palestine J. Bot. (R), 1941, 4: 11-9, bibl. 1.

Cone-shaped cushions of roots, termed here from their shape root-stalagmites, developed under and above the surface of the soil under dripping taps at Rehovot Research Station. Roots of various near-by shrubs contributed to the cone and it was found that some species, e.g. *Duranta plumieri*, showed less positive hydrotropism than others, of which *Nerium oleander* seemed the most sensitive. As the size of the cone increased the roots in the interior became humified through lack of oxygen. The structures developed best in the shade, the rate of reformation in height after removal being 3-4 cm. the first year, 2-3 cm. the second year, diminishing in time to almost nil. A typical example measured on the surface 36 cm. in width and 16 cm. in height. It is noted that oleander seems a suitable subject for the experimental study of root hydrotropism in the higher orders of plants. The article is well illustrated.

Physiology.

1174. SNOW, R. 581.143.5
On the causes of regeneration after longitudinal splits.

New Phytol., 1942, 41: 101-7, bibl. 3.

In young stems and root tips split longitudinally the halves of the cambial ring become rounded off into two new rings by regeneration on the inner side especially in the root tips, even when steps are taken to render such regeneration difficult, as by uniting lightly the split portions. The causal factor of this regeneration is shown to be neither a wound substance nor the formation of a new surface. It is inferred that there is an interruption of some laterally moving process which normally maintains the morphological unity of the organ in the lateral directions. If the nature of such a process could be discovered it would be possible to interpret physiologically a morphogenetic field. This transverse process is not the movement of a hormone capable of diffusing out of the cells and it appears to need continuity of protoplasm.

1175. VOLODIN, A. P. 581.144.4: 581.036
A new device for measuring leaf temperature.

C.R. Acad. Sci. U.R.S.S., 1940, 27: 487-8, bibl. 3.

The author describes a simple device for measuring leaf temperatures. The device includes five copper and constantan thermocouples united in a battery according to a scheme which is here shown in diagram.

1176. NADEL, M. 581.49

Sur la mesure de l'ouverture des stomates.

(Measuring stomatal apertures.)

Palestine J. Bot. (R), 1940, 3: 1-64, bibl. 62.

The author gives a detailed, illustrated account of experiments made to test the limits of application of the Lloyd method for the measurement of stomata by fixation in alcohol and to compare it with others. The method was applied to the leaves of 19 species and results lead the author to put leaves in three categories according to whether the epidermis is very firmly attached to the mesophyll, adheres to the mesophyll and can be detached with difficulty, or adheres but can easily be detached by pulling. Lloyd's method was found to be successful only with the last of these groups. It was found possible to replace alcohol used for fixing the stomata by dioxane or acetone. A study was made of the *post mortem* movements of the stomata and this led to an anatomical and histological examination of the stomata conducted with equal success by polarization, fluorescence and histological chemical methods.

1177. BIEBEL, J. P. 612.014.44
Some effects of radiant energy in relation to etiolation.

Plant Physiol., 1942, 17: 377-96, bibl. 13.

The plant material used in these experiments, carried out in an air-conditioned dark room, consisted of seedlings of red-kidney bean, Alaska pea, maize, *Xanthium pennsylvanicum*, *Helianthus annuus* and *Vicia faba*. They give further information of the quantitative responses of seedlings to irradiation and throw some light on the internal mechanism causing these responses.

1178. ZALENSKY, O. V. 541.144.7: 581.132
Photosynthesis of plants at high altitudes.

C.R. Acad. Sci. U.R.S.S., 1941, 31: 61-4, bibl. 6.

From the experimental data reported here it would appear that, under such conditions as occur in the Eastern Pamir mountains of Turkestan at a height of 6,000 m., assimilation of CO₂ is only possible for very short periods on a few days in the warmest period.

1179. NICHIPOROVITCH, A. A., AND VASSILIEVA, N. G. 581.132

Device for measuring the rate of photosynthesis in plants.

C.R. Acad. Sci. U.R.S.S., 1941, 31: 65-8.

An apparatus for measuring the rate of photosynthesis is described with diagrams. It is claimed that in the apparatus it is possible to control (1) the intensity of illumination by shifting or screening the lamps, (2) the content of CO₂ in the air current and (3) the thermal regime by varying the temperature of the water in the bath.

1180. RICHTER, A. A., AND VASSILIEVA, N. G. 581.132: 631.811.9

Spraying with microelements as a method of increasing the rate of photosynthesis.

C.R. Acad. Sci. U.R.S.S., 1941, 30: 659-60.

In laboratory experiments assimilation was increased by spraying: *Vicia faba* with 0.02% solution of KI, and with 0.02% solution of H₂BO₃; sunflower leaves with KMnO₄, 0.000632 Mol and 0.001264 Mol; kok-saghyz with ZnSO₄, 7H₂O, 0.000174 Mol and 0.00000348 Mol; perilla and hydrangea leaves with ZnSO₄, 7H₂O, 0.000348 Mol. The effects generally lasted several days.

1181. MATHER, M. 581.14: 581.057+551.52
The effect of temperature and the moon on seedling growth.

J. roy. hort. Soc., 1942, 67: 264-70.

In previous experiments (H.A., 11: 1076) the moon's phases were found to have no effect on germination of seed. A later series of experiments is described in which the phases of the moon were found to have no effect on seedling growth. Some interesting results were, however, obtained

in regard to the effects of light and temperature. Two strains of maize differed in their reaction to light, one, a vigorous commercial strain, producing smaller plants when near the side glass than when slightly farther away; the other, a less vigorous maize, reacting in the opposite manner. In the case of tomato the boxes slightly farther away from the glass (the width of a seed box only) always produced larger plants than the boxes nearer the glass. Increased temperature caused greater growth in both tomato and maize but the stage at which the rise in temperature is most effective differs; in tomato it is immediately after germination but in maize the plant does not fully react until it has become well established.

1182. ZIMMERMAN, P. W., AND HITCHCOCK, A. E. 577.15.04
Substituted phenoxy and benzoic acid growth substances and the relation of structure to physiological activity.
Contr. Boyce Thompson Inst., 1942, 12: 321-43, bibl. 14.

Of new growth substances tried, 2,4-dichlorophenoxyacetic acid and its derivatives were the most active for growth, comparing favourably with naphthaleneacetic acid. 2-Bromo-3-nitrobenzoic acid showed growth activity down to 0.05% in lanolin. All the chlorophenoxy compounds having growth activity also affected the morphology of the organs developed under their influence. The P-chloro and 2,4-dichlorophenoxyacetic acid and amides were the most active in inducing adventitious roots. The chlorophenoxy compounds induced parthenocarp in tomato and cucumber.

1183. CLARK, H. E., AND KERNS, K. R. 577.15.04: 581.145.1
Control of flowering with phytohormones.
Science, 1942, 95: 536, bibl. 9.

Low concentrations of α -naphthaleneacetic acid applied as sprays to the foliage of *Ananas comosus* induced formation of inflorescences in advance of the normal period, but high concentrations, particularly when applied in solution at the apex, delayed flowering far beyond that of the controls. In these experiments the application of the hormone in low concentrations seems to have initiated the differentiation of the floral parts. There was no external evidence of abnormal development of the tissues, but with high concentrations this was not the case. Acetylene and ethylene compounds quite unrelated to this phytohormone also induce premature flowering in *Ananas*.

1184. NELSON, R. C. 535.33: 631.8
A grating spectrophotometer for mineral nutrition studies.
Plant Physiol., 1942, 17: 492-6.

A description with diagram is given from the Minnesota Agricultural Experiment Station of an inexpensive spectrophotometer using a concave diffraction grating replica to disperse light. It is said to have proved satisfactory for the analysis of plant ash and to be rapid and economical in its operation.

1185. MURNEEK, A. E., AND WITTMER, S. H. 581.162: 581.14
Relation of sexual reproduction to development of horticultural plants. I. General effects of flower and fruit production.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 201-4, bibl. 4.
WITTMER, S. H., AND MURNEEK, A. E.
Relation of sexual reproduction to development of horticultural plants. II. Physiological influence of fertilization (gametic union).
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 205-8, bibl. 3.

The first paper deals with the noted general effects of flower and fruit production on subsequent growth, behaviour and chemical composition of some common vegetable and

flower varieties. These were subjected to daily or periodic disbudding, defloration or defruiting. Records were taken of the total number of flowers produced, the dry weights and the total accumulation of nitrogen and carbohydrates in various parts of the plants. Results are discussed. As the result of their work on cucumber, peppers and cherries described in the second paper the authors conclude as follows:—"The data herein presented indicate that as a result of sexual reproduction, the vegetative parts of a plant are vitally influenced. Due to fertilization of flowers, the growth of not only the fruit but also the vegetative portions of the plant are stimulated. It seems reasonable to conclude that some catalyst or substance of hormone-like nature must be produced at the time the male and female gametes unite, resulting in increased vegetative development. Triple union, or endosperm formation, may also be effective in the production of a stimulatory substance. Investigations are under way to extract and isolate such a substance or substances."

1186. BECK, W. A. 581.175.11: 632.112
Effect of drought on the production of plant pigments.
Plant Physiol., 1942, 17: 487-91, bibl. 6.

Experiments at Cincinnati showed that only extreme drought seriously affects the production of pigments in sunflower seedlings. They confirm the previous conclusion that heat and light are the major factors influencing pigment production.

1187. SIDERIS, C. P. 546.331.31: 632.1
An atmospheric halatometer.
Plant Physiol., 1942, 17: 497-9, bibl. 1.

Description of apparatus designed to collect and measure the salt particles from the atmosphere such as are deposited on Hawaiian pineapple fields by trade winds.

1188. JONES, R. J. 631.874
Nitrogen losses from Alabama soils in lysimeters as influenced by various systems of green manure crop management.
J. Amer. Soc. Agron., 1942, 34: 574-85, bibl. 8.

The general conclusions drawn are that summer legumes should be turned in in the spring in sandy soils, unless a winter cover crop is to be grown; that winter crops greatly reduce the loss of nitrogen by leaching; that the loss of nitrates is related to the texture of the soil; that soils should not be left fallow during seasons of heavy rainfall or serious leaching of nitrogen will occur.

1189. BERTRAMSON, B. R. 581.192: 546.18
Phosphorus analysis of plant material.
Plant Physiol., 1942, 17: 447-54, bibl. 14.

1. A method is presented whereby the total and inorganic phosphorus portion of plant material may be determined quickly and accurately. 2. Data are submitted to prove the stability of the organic phosphorus in a 1% by volume sulphuric acid solution; thereby demonstrating that it is a definite fraction of the total phosphorus in plant material. [Author's summary.]

1190. VAN DER MERWE, D. J. 546.711: 581.192
The occurrence, characteristics and function of manganese in soil and plant.
Fmg S. Afr., 1942, 17: 360-4.

A general account is given of abnormalities in plants resulting from manganese deficiency. The results of a soil survey for manganese in various parts of South Africa are reported. Where the deficiency was reflected in the crops the steps taken to effect a cure are recorded. Although deficiency of manganese in soils can be readily determined by chemical analysis, it is less easy to discover whether the manganese present is available to the plants, owing to the number of factors which affect the solubility of the element.

1191. EATON, F. M. 631.453: 581.192
Toxicity and accumulation of chloride and sulfate salts in plants.

J. agric. Res., 1942, 64: 357-99, bibl. 34.

Experimental material for sand cultures in the open consisted of dwarf milo (*Sorghum vulgare*), Acala cotton, rooted lemon cuttings, barley, navy beans, sugar beet, alfalfa and tomato. Trials in the greenhouse concerned tomatoes, cotton, wheat and maize. Results are discussed at some length.

1192. STEWART, W. S., AND ANDERSON, M. S. 577.15.04: 631.423
Auxins in some American soils.

Bot. Gaz., 1942, 103: 570-5, bibl. 20.

A method of extraction and assay of auxins in soils is described. Auxin determinations were made on the two upper horizons of eleven virgin soils representative of four of the great soil groups. In very fertile surface soils and subsoils auxin was found to the extent of about 0.175 micrograms per kilogram of soil (indoleacetic acid equivalents). In less fertile soils much less auxin was found in the surface horizons and little if any in the second horizons.

1193. FRAPS, G. S., AND FUDGE, J. F. 577.16: 631.8
Vitamin B₁ (thiamin) and other vitamins as fertilizers.

Circ. Tex. agric. Exp. Stat. 95, 1942, pp. 16, bibl. 42.

In experiments at College Station, Texas, vitamin B₁ produced a slight increase in size of zinnia blooms and pansy plants and flowers but had no favourable effect on snapdragon, begonia, cineraria, alternanthera or asparagus plumosus. From this and the evidence of workers elsewhere the authors conclude that vitamin B₁ may help some plants to overcome the shock of transplanting by stimulating rootgrowth, that it may help in the growth of some naturally slow growing plants, but that it has little or no effect on most flowering plants, vegetables, grass or trees. There are no indications that the application of other vitamins will be more successful. It would seem that most plants produce in their leaves sufficient supplies of vitamins for their own use while others get it from the soil in sufficient quantity.

1194. TUKEY, H. B. 577.16: 577.15.04
Vitamin B₁ and plant growth.

Rur. New-Yorker, 1942, 101: 323, 327.

The limited data do not warrant recommending vitamin B₁ in plant culture except for experimental purposes. Experimental results obtained with vitamin B₁ as a stimulant for plant growth are discussed and a warning is given against acceptance of the extravagant claims put forward by interested persons. It is shown that in most cases the growth increases attributed to the application of the vitamin are merely a result of the increased cultural care given to the treated plants.

1195. OWTSCHNINKOW, N. N. 581.132
Zur Frage des Chemismus der Photosynthese. (The chemistry of photosynthesis as shown in the catalase of photosynthesis.)

C.R. Acad. Sci. U.R.S.S., 1941, 31: 163-4, bibl. 4.

CLAYPOOL, L. L., AND KEEFER, R. M. 581.12
A colorimetric method for CO₂ determination in respiration studies.

Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 177-86, bibl. 3.

Descriptions including photographs and diagrams.

- MONTERMOSO, J. C., AND DAVIS, A. R. 581.11
Preliminary investigation of the rhythmic fluctuations in transpiration under constant environmental conditions.

Plant Physiol., 1942, 17: 473-9, bibl. 14.

Coleus blumei was the species used.

- CHEADLE, V. I. 585.1: 581.176.1
The occurrence and types of vessels in the various organs of the plant in the *Monocotyledoneae*.

Amer. J. Bot., 1942, 29: 456-9.

- ROBINSON, R. 581.175.11
The red and blue colouring matters of plants.

Endeavour, 1942, 1: 92-101.

- KRAJEVOY, S. J., AND NECHAEV, I. 631.541
Atropine transference from stock (*Datura stramonium*) to scion (*Solanum lycopersicum*).

C.R. Acad. Sci. U.R.S.S., 1941, 31: 69-70, bibl. 12.

- HILLARY, B. B. 578.6
Improvements in the permanent root tip squash technic.

Stain Tech., 1939, 14: 97-9.

- OLSON, O. E., JORNLIN, D. F., AND MOXON, A. L. 546.23: 631.4
The selenium content of vegetation and the mapping of seleniferous soils.

J. Amer. Soc. Agron., 1942, 34: 607-15, bibl. 7.

- SHERMAN, G. D., AND MCHARGUE, J. S. 631.423: 546.56 + 546.47
Methods for determination of copper and zinc in soil.

J. Ass. off. agric. Chem. Wash., 1942, 25: 510-5, bibl. 5.

- HAMLAY, D. H. 77: 581.48
Seed stereophotography.

Reprinted from *C.R. Ass. int. Ess. Semences*, 1938, No. 1, pp. 346-51, together with 15 figures.

Propagation.

1196. GRAY, N. E., AND FULLER, H. J. 581.142: 546.49
Effects of mercury vapor upon seed germination.

Amer. J. Bot., 1942, 29: 456-9.

Seeds of pea, maize, bean, radish, sunflower and cucumber stored for 6 months in nearly airtight containers in mercury vapour showed no ill effects as regards germination or seedling growth. Germination in mercury vapour of these seeds was slightly retarded but otherwise not affected. Seedlings grown in mercury vapour both in the air and growth medium or only in the air showed stunted growth, yellowing of leaves, failure of leaf development and early leaf fall.

1197. STOUTEMYER, V. T. 631.535
Humidification and the rooting of greenwood cuttings of difficult plants.

Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 301-4, bibl. 4.

In trials at Glenn Dale, Md, the beneficial effects of keeping the air of a propagating house at a high degree of humidity were found to be similar to those got by using a spray which washes the foliage of the cuttings—provided the latter is not excessive. Experiments are described in which a centrifugal atomizer was successfully used to maintain high humidity. The advantage of humidification was slight or doubtful with cuttings of *Leucothoe*, *Stauntonia*, *Pterostyrax* and *Thladiantha* and with *Corylus* a definite adverse effect may have been produced. With other difficult

subjects, especially *Chionanthus*, *Chaenomeles* and *Ligustrum* clones, the benefits were unquestionable.

1198. MOSHKOV, B. S. 631.541

Elimination of leaves in grafting.

C.R. Acad. Sci. U.R.S.S., 1941, 31: 161-2.

Experiments are reported on different degrees of leaf removal and their effect when grafting *Perilla nankinensis* on *P. ocimoides*.

1199. EFEIKIN, A. K. 631.535

Influence of the age of cuttings on the plants developing from them in relation to the question of irreversible ageing of meristem.

C.R. Acad. Sci. U.R.S.S., 1940, 28: 454-8, bibl. 10.

Tomato plants afforded the experimental material. The data obtained do not support the idea that the ageing of formative tissue is irreversible.

Cultural practice.

1200. CROWTHER, E. M. 631.8

Fertilizer policy on the farm.

Agriculture, 1942, 49: 68-79.

Suggestions are made for the best use of the fertilizers available under present conditions in Great Britain. Both cropping and supplies have changed drastically since the war and farm practice and use of fertilizers must also be changed in important ways.

1201. MOFFATT, J. R. 631.67

Laying a water supply to agricultural land.

A labour saving method.

Agriculture, 1942, 49: 120-2.

Joined-up lengths of piping are pulled into the ground behind the mole of a mole plough.

1202. KEEN, B. A. 631.516

Hoeing.

J. roy. hort. Soc., 1942, 67: 323-8.

The value of hoeing lies in the suppression of weeds which might compete with the plant and not in the formation of a dust mulch which, as was until recently supposed, would prevent the evaporation of soil moisture by breaking up the ends of the capillary tubes. Actually soil moisture tends to remain static and does not move up from below to replace loss. Experiments carried out at Rothamsted which bear out these statements are described. Hoeing can, if over indulged in, actually reduce the crop. Much work on cultivation has been done in the U.S.A., but the results attained have received little notice in Great Britain.

1203. GAHLNBÄCK, J. 634.98-1.57: 631.878

Eignen sich Holzabfälle als Ersatz für Torfmull?

(Can wood waste take the place of peat mould as a source of humus?)

Bodenk. Pflernähr., 1942, 27: 368-70.

Experiments at Pillnitz indicate that wood waste cannot replace peat mould as a source of humus.

1204. REINHOLD, J. 631.589: 634/635

Gemeinschaftsversuche zur Prüfung des Wegabodenbelages. (Co-operative trials of soil mulching with Wegamulch.)

Forschungsdienst, 1942, 24: 129-38, bibl. 40.

Wegamulch consists of impregnated, black wood shavings. This is used as a soil mulch at the rate of about 1 kg. per square metre. Results of trials were on the whole very disappointing. Soil temperatures were somewhat levelled. In the summer, morning and evening temperatures were only slightly lower than on untreated soils while midday temperatures were considerably lower. In spring the soil temperatures of the treated soils were lower and in autumn higher. The water content of the soil was increased. Soil reaction remained unaltered. Soil nutrients were also not affected except that nitrate formation was checked. Production of CO₂ by the soil was somewhat lowered. Weeds were checked, but even so hoeing remained necessary. Generally speaking cropping was not improved. More than half the 27 trials gave doubtful results and more than a third showed decreased cropping. Earliness of cropping became in many cases less conspicuous. The omission of one cultivation, so as not to disturb the mulch, led to decreased crops. Trials were made on vegetables, flowers, nursery plants and fruits. Of the vegetables those whose heat requirements are small showed slightly favourable results from the treatment. The more a crop needs heat the more obvious is the failure of the treatment. In the nursery there were no perceptible results. The time was too short to get any results with fruit trees. Certain qualitative improvements in vegetables and strawberries did not make up for decreased crops, and in most cases quality was not affected. In some cases of increased crops the increase did not counterbalance the increased costs.

1205. MCCOOL, M. M. 631.876.9

Agronomic value of kitchen waste.

Contr. Boyce Thompson Inst., 1942, 12: 345-58, bibl. 9.

The effect of air-dried and ground samples of kitchen waste on growth of tobacco and millet in the greenhouse and of sweet corn in the open proved them less effective for the first crop than tankage, though superior to cow manure and shredded farmyard manure, when compared on the basis of the addition of equal amounts of nitrogen to the soil cultures. The residual effects were, however, greater than those from tankage and the manures used.

1206. CHILDS, E. C. 631.62

The mechanics of mole-draining.

Emp. J. exp. Agric., 1942, 10: 169-81, bibl. 2.

to Portuguese conditions especially in that portion which concerns the future.

1208. ROTHMALER, W. 581.9(469)

Roteiro das plantas cultivadas até Portugal.

(A log book of plants cultivated in Portugal.)

Rev. agron. Lisboa, 1941/2, 29: 323-37.

A history of the introduced and domesticated plants of Portugal. Maps indicate routes by which plants have reached Portugal in both prehistoric and historic times. In the text the part played in plant introduction by the

TREE FRUITS, DECIDUOUS.

General.

1207. NATIVIDADE, J. V. 634.1/8

O comando científico da produção fruteira.

(The influence of science on fruit production.)

Rev. agron. Lisboa, 1941/2, 29: 298-323.

An account of the progress of fruit culture from the earliest to modern times. The influence of the work of the early horticulturists is traced, the achievements of science at the present day are discussed and problems still to be solved are reviewed. The discussion is, naturally enough, oriented

various races which have invaded or traded with Portugal is discussed.

1209. GRIGOR'EV, I. J.

634.1/2-1.53

Michurin's successor.

Sady i Ogorody, 1941, No. 4, pp. 4-5.

This is a short account of the work of one of Michurin's pupils, P. N. Jakovlev, who began his apprenticeship in 1923. Among his early studies were such problems as the rooting of leaves and parts of leaves, and the bringing about of vegetative union between plants which botanically are but distantly related. He also conceived the idea [though the author does not make it clear whether it was put into practice] of producing perennial tomato plants by means of interspecific hybridization. Much of his subsequent work was connected with the manipulation and control of plant development by bringing about vegetative union, by grafting or the employment of mentors, between specimens of different varieties, different species, and even different genera of tree and bush fruits, often chosen from parts of the world which are far apart, in order to produce vegetative hybrids which possess, or are on the way to possessing, certain desired qualities, such as winter-hardiness or fruit of good flavour. In the spring of 1940 seeds of the peach and almond-peach, having just begun to sprout, were inserted under the bark of the wild sloe, sand cherry (*Prunus besseyii*) and Virginia cherry. This method of vegetative hybridization [called by the author the "little key" method] is expected to prove powerful and effective. The method of mentors was used to modify the hereditary characters of hybrids consisting of the wild sloe, Chinese plum and the sand cherry on the one hand, each in turn combined with the cultivated peach on the other. In order to improve the quality of certain hybrid seedling pears, vegetative hybridization was resorted to, grafting being done on the roots of the seedling stocks. In 1940 a hybrid of the Chinese plum and an almond seedling (as intermediary) was obtained, which as a new intermediary, was to be hybridized with a peach. This method of "double intermediaries" has been devised by Jakovlev to facilitate the rapid production of a peach capable of being grown under northerly conditions.

1210. RUBTSOV, G. A.

634.13

Origin and evolution of the cultivated pear.

C.R. Acad. Sci. U.R.S.S., 1940, 28: 350-3.

A consideration of evidence on the existence of different types of pear in different parts of the world shows how the excellent flavour of European varieties is the result of breeding and systematic selection. To create early bearing varieties resistant to fungus and bacterial diseases, it is suggested that the most promising course would be hybridization with *Pyrus serotina* and *P. betulafolia*, and to get hardy varieties crossing with *P. ussuriensis* should be tried. For drought resistance under certain U.S.S.R. conditions hybridization will be necessary, using the species *P. salicifolia*, *P. elaeagnifolia*, *P. syriaca*, *P. heterophylla* and *P. korshinskyi*.

1211. RUBTSOV, G. A.

634.13: 581.4

Ontogeny, age modifications and anomalies in the development of the pear.

C.R. Acad. Sci. U.R.S.S., 1941, 30: 79-81, bibl. 9.

In all species of pears young trees differ markedly from mature trees both morphologically and biologically. These differences concern the shape, size and serration of the leaves, pubescence and colour of shoots, character of growth, fruit character, reaction to environment. In their juvenile stages the different species have more similar features and are closer to a common type than in their mature state. The deviations shown by individual development are discussed. An ability to produce vegetative fruits (see H.A., 9: 63) was noted by the author in varieties inclined to bloom a second time, such as Jules Guyot at the Maikop Experiment Station and Finland Yellow at the

Krasny Pakhar Experiment Station near Leningrad. If it were possible to fix and develop this ability it is thought that vegetative pears might be of practical significance.

1212. EL TAHER, N.

634.37-1.56

The importance of the fig, its drying and packing.

Agric. Bull. Palestine, 1941, July to September, pp. 208-11.

In Palestine the fig grows fairly well with little care even on poor soils. The value of the fruit lies in its definite laxative effect and high alkalinity. It is rich in sugar, calcium, iron and copper. Drying figs should contain at least 14% of sugar. Thin-skinned white figs of large size are preferred, though black can be used. A list of useful local varieties is given. Imported commercial varieties from fig-growing countries have been tried but cannot at present be recommended. The figs to be dried are not picked but allowed to ripen and fall to the ground assisted thereto by a light shaking of the branches. Picked figs are liable to go sour on the drying tray or to develop mould. Various ill effects which are named may result if the fallen figs lie on the ground longer than two or three days. Various methods of drying figs both ancient and modern are described. The method most in use is to place the figs in perforated buckets and dip them in hot 2½% brine solution for 60 seconds before spreading out to dry in the sun on trays or ground. They are turned at least once. They dry unevenly and are removed from the tray as they become ready, this being when the fruit feels firm in the hand, elastic or leathery and no juice oozes from the eye. At this stage the figs are put in sweat boxes or in heaps and turned on alternate days. Sweating renders the fruit pliable, distributes the moisture more evenly and provides a better texture. Before packing the figs are softened by dipping in boiling 2½% brine solution for one to three minutes. By this means also insect pests are killed and the package weight increased. Careful sorting is carried out before packing, the culls being sold to alcohol distilleries. After grading into three sizes the fruit is flattened by hand or in special screw presses and packed in layers in boxes, the stalks of each layer pointing in the opposite direction to the layer below. In the uppermost layer only the eyes all facing upwards are shown. The principles are the same when the figs are packed in square pressed blocks in cellophane.

1213. ROBERTS, R.

634.63

Olive culture.

J. Dep. Agric. Vict., 1942, 40: 295-300.

In quality Australian olive oil can compete with the imported product and if the industry were protected against cheap imports it could become firmly established. This article describes the most up-to-date methods of olive culture adapted to Australian conditions.

1214. MAZZOLANI, G.

634.63

La patria dell' olivo. (The home of origin of the olive, *O. europaea*. Certain aspects of a botanical study.)

Ital. agric., 1942, 79: 367-72, bibl. 3.

A consideration of the botanical aspects of the olive and of how they may be of use for the identification and classification of olive trees.

1215. WOODWORTH, H. C., AND POTTER, G. F.

634.11-1.16

Studies in economics of apple orcharding. III. A study of orchard problems by the budget method of analysis.

Bull. New Hamp. agric. Exp. Stat. 323, 1940, pp. 23.

The information given here supplements and expands in the light of further data that given in bulletins 257 and 279. It concerns apple growing under the sod mulch system in New Hampshire. It discusses the very many different facts which vitally affect the economics of apple growing. They

include labour, materials, rentals, yields, prices, types of planting, late bearing, inventory values, value of filler trees, etc.

1216. HOOS, S., AND SHEAR, S. W. 634.13: 658.8
Relation between auction prices and supplies of
California fresh Bartlett pears.
Hilgardia, 1942, 14: 233-319.

The economic reasons governing the prices reached by Bartlett pears from California are examined and discussed in considerable detail.

1217. FLOOR, J. 631.52
Over het beschrijven van variëteiten. (The
description of varieties.)
Meded. Lab. Tuinbouwl. Wageningen 28, 1937,
pp. 13.
N.B. Translation now available at Bureau.
CONDIT, I. J. 634.37
The Croisic (Cordelia) [St. John] fig.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40:
255-8, bibl. 14.

Propagation.

1218. DUFOUR, A. 634.1/2-1.541.44
Quelques aspects du surgreffage des jeunes
couronnes d'arbres fruitiers. (Some aspects
of topworking young fruit trees.)
Rev. hort. Suisse, 1942, 15: 81-6.
LUGEON, A. R.
A propos de greffage. (On the question of
grafting.)
Ibidem, 1942, 15: 153-4.

Reasons are given why, on occasion, young fruit trees may require to be topworked. Two scions are placed on the extremity of the headed back branch. One of these must be removed as soon as the top is completely callused over. Which of the two to select is a matter to be determined at the time of removal. It should be the scion which appears best placed to carry on the continuity of the branch. In cutting the scion for grafting it should be so contrived that there is a bud at its base directed outwards which can be grown on at once to form a lateral in support of the scion bud which is to extend the main growth. At the first pruning the requirements of this lateral must override those of the accessory scion. The latter must not be allowed to interfere either with the chosen scion or its lateral. The instructions are made considerably clearer by thirteen illustrations.

Lugeon remarks that the instructions seem to refer only to trees on which the branches to be grafted are comparatively thin. With branches in which the diameter of the cut end exceeds 10 cm., callusing may take years. In such cases up to 4 scions may be required and it may be better to leave them all to form fruiting branches rather than to eliminate any. A suggestion by Dufour that the stock bud at the base of the scion often may well be sacrificed in favour of a higher placed lateral on the scion is criticized.

1219. ANON. 634.1/2-1.541.44
El reinjertar los árboles frutales. (Converting
fruit trees by regrafting.)
Sugest. oportunit. Fruticult. Rio Negro, July
1942, pp. 4.

Reworking fruit trees older than seven years by wedge grafting the stump on heavily cut back branches, as commonly practised locally, results in many losses for reasons explained. Porcupine grafting is suitable for younger trees but often impracticable for older ones on account of the great number of scions required. A successful method with older trees is to cut back the main branches to a suitable level, leaving about 4 secondary nurse branches evenly distributed. The tree is left alone for a year, during which time the stumped branches will produce suckers. The nurse branches may be allowed to fruit as usual. The

following year a selected number (8 to 10) of these suckers are double tongue grafted and the remainder cut out. The thinner suckers should be used or, failing this, the stout ones should be grafted at a higher level where they are thinner. The nurse branches are removed the following year. The finer points of this method are explained in detail. It is mentioned that Cox's Orange Pippin is almost always a failure as a stock for other varieties.

1220. HÜLSMANN, B. 634.1/2-1.541.5
Weitere Untersuchungen zum Leittrieb-
kammerverfahren bei Okulanten und Stammver-
längerung in der Obstbaumschule. (Further
trials of the main stem guide technique when
budding and stem building in the nursery.)
Gartenbauwiss., 1941, 16: 163-73, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 74.

Further experiments are reported on the use of a metal guide used when budding orchard trees, the purpose being to make the shoot from the newly inserted bud grow exactly in the right direction. Trials show that gum formation generally makes the operation a dangerous one for stone fruit trees, but that the new model guide will give excellent result with pome fruit trees and other plants which do not tend to form gum.

1221. JOLEY, L. E. 634.23-1.541.11
Overgrowth produced by edible cherry on
Sargent cherry.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 277-8.

Topworking edible cherry varieties, 5 sweet and 1 sour, on to the current growth of 2-year-old *Prunus sargentii* seedlings at Glenn Dale, Md, resulted, where successful, in very noticeable overgrowth by the scion in every case. Such combinations can only be shortlived and the use of this hardy flowering cherry for rootstock purposes seems out of the question.

1222. GARNER, R. J. 631.541: 634.1/2
Grafting established fruit trees. A wartime
solution to a wartime problem.
A.R. East Malling Res. Stat. for 1941, A25, 1942,
pp. 60-8.

Surveys have shown that the chief reason for inadequate cropping is often lack of pollinators. Since at East Malling it has been found possible by grafting to change from one variety to another so as to give ample pollen from the new variety in two years and incidentally a crop of up to 5 bushels in three years, this account of the latest methods of frame-working and of ordinary topworking should prove useful. Instructions are given on times of grafting, selection of scion wood, tools and grafting wax. The author again recommends and details how to prepare a well-proved grafting wax.* This melts at above 150° F. and at considerably higher temperatures retains sufficient body, cooling slowly even in cold weather. The different operations of frame-working, viz. stub grafting, side grafting, oblique side grafting, inverted L bark grafting and slit grafting are considered in detail with helpful illustrations, and notes are given on after care. As regards normal topworking, the following methods are similarly described:—oblique cleft grafting, rind grafting (or crown graft), whip and tongue grafting. Finally the operations of bridge grafting and inarching are carefully described.

1223. HITCHCOCK, A. E., AND ZIMMERMAN, P. W. 577.15.04: 634.11-1.535
Root-inducing substances effective on apple
cuttings taken in May.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 292-7, bibl. 2.

Cuttings of McIntosh, Grimes Golden, Northern Spy, Rhode Island, Greening, Stayman Winesap and Yellow

* See *Occ. Pap. Imp. Bur. Hort.* 5, 1938, pp. 19. 1/-, reprinted in *A.R. East Malling Res. Stat. for 1937*, A21, 1938, pp. 242-56.

Transparent exhibited relatively high percentages of rooting in a sand medium when taken in the period 9 May-3 June and treated with powder preparations of various strengths of indolebutyric acid in talc and of naphthaleneacetic acid. On the basis of these results it is suggested that apple cuttings should be taken when the shoots are 4 to 7 inches long (in May at Yonkers, New York), treated with an 8 mg./g. powder preparation of indolebutyric acid and then planted in sand on greenhouse benches, with enough shade to keep the cuttings turgid.

1224. LUCKAN, J. 634.23-1.541.11
Versuche über Selbstbewurzelung bei Vogelkirschen. (Tests of self rooting in the bird cherry.)
Blumen- u. Pflb., 1941, 45: 258-9, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 58.

An account of successful attempts to induce selected bird cherries to root in the stool bed.

1225. SINHA, A. C. 634.22-1.541.11-1.534
Studies on the vegetative propagation of plum rootstocks by layering.
J. Pomol., 1942, 20: 1-11, bibl. 26.

Observations made in the autumns of 1932, 1938 and 1939 in Pershore plum layer beds are discussed. Rooting varied yearly, possibly as a result of rainfall at critical growth period. Rooting was not affected significantly by number of layers per plant. Short layers had proportionately more shoots than long ones and the percentage of rooting progressively decreased with increased length of layer. Nearness to the base of the parent corresponded with more, thicker, longer and better rooting shoots. No correlation was established between length of shoot and rooting. The longer the etiolated portion of the shoots, the more numerous were the roots formed. Shoots arising from buds on the under-surface and sides of the layers rooted better than those from buds on the upper surface. Shoots that continued terminal growth until late in the season rooted significantly better than those which stopped growth earlier. It was found possible to increase rooting significantly without reducing the number of shoots by cutting back the layers to about 2 ft. and by partially disbudding the shoots at the time of layering. The application of indolebutyric acid in lanolin had no effect on rooting in Pershore or pear C8 layers, though summer applications to the shoots did improve it in myroblan B, which roots easily in any case.

1226. UPSHALL, W. H. 634.25-1.531
Methods of handling Elberta peach pits in relation to nursery germination.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 279-82, bibl. 3.

Rootstocks.

1227. MCCLINTOCK, J. A. 634.11-1.541.11
Preliminary observations on the fruiting of varieties other than Grimes on Virginia Crab stocks.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 275-6, bibl. 5.

Trials in Indiana appear to afford sufficient data to indicate that Hibernial and Virginia Crab stocks are hardy, well-rooted, with strong trunks and wide-angled crotches and that they are congenial to most commercial varieties of apple grown in the U.S.A. The resistance of Hibernial to collar rot (*Phytophthora cactorum*) is not known. Virginia Crab does not transmit its resistance to this disease to its scions, hence the budding or grafting into the scaffolds has proved more successful with this stock than topworking into the trunks by grafting.

1228. SHAW, J. K. 634.11-1.541.11
Trunk diameters of young apple trees on clonal stocks.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 269-71.

The average trunk diameter below the union and at the swell are recorded for from 8 to 12 trees of Baldwin, Golden Delicious, Kendall, McIntosh, Oldenburg, Red Gravenstein, Red Spy, R. I. Greening, Starking and Wagener on a varying number of the Malling rootstocks and comments are made on the data afforded.

1229. HEWETSON, F. M. 634.11-1.541.11
Growth and yield of Steele Red apple trees as influenced by the use of various double-worked interstocks.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 264-8, bibl. 5.

Trials of intermediate rootstocks for Steele Red apple trees at East Lansing, Mich., showed that each type of clonal interstock behaved in its own way. Thus the use of Northern Spy as intermediate produced the highest yielding and some of the largest trees. Red Astrachan and Fameuse as intermediates produced large trees which did not bear well. Yellow Bellflower as intermediate did not appear to influence size but it certainly decreased yield. Finally Virginia Crab intermediates produced the smallest but heaviest-yielding trees of all.

1230. DAY, L. H. 634.2-1.541.11
Orchard identification of stone fruit rootstocks.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 272-4, bibl. 5.

Notes on quick methods of differentiating between apricot, plum (myroblan), peach, almond and cherry (mahaleb, mazzard and morello) rootstocks.

1231. LUCKAN, F. 581.144.2: 634.13 + 634.14
Bewurzelung von Birne und Quitte. (Rooting of pears and quinces.)
Gartenbauwirtsch., 1941, 58: 25: 3, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 58.

Root box trials show that very much the most satisfactory root formation occurs in pear and quince when the medium is of a sandy nature well provided with organic matter, and they indicate the desirability of such a soil for rootstock stool beds.

1232. PLOCK, H. 634.14-1.541.11
Die Unterlagenfrage bei Quitten. (The problem of rootstocks for quinces.)
Gartenbauwirtsch., 1941, 58: 40: 4, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 26.

For bush trees East Malling quince A is used as rootstock, for standards and half-standards hawthorn (*Crataegus oxyacantha*). Quince varieties are often double-worked on white-flowered hawthorn as rootstock with red-flowered hawthorn as intermediate stem builder. Grafting is easier in apple-shaped quince than in pear-shaped. Of late pear varieties have been used as stem builders for standards, Gellert's Butterbirne being often used as the result of long experimental work in South Germany.

1233. HILKENBÄUMER, F. 634.23-1.541.11
Über die Unterlagen für Grosse lange Lotkirsche. (Rootstocks for the morello cherry.)
Blumen- u. Pflb., 1941, 45: 344-5, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 58.

A plea for the bird cherry as a rootstock for the morello in view of its hardness. Given equally good soil conditions it induces fruiting as early as *P. mahaleb* and in greater abundance. The advantage of *P. mahaleb* lies in its great adaptability to soil conditions, its only failures being on moist, ill-drained or excessively rich soils.

Pollination.

1234. GRIGGS, W. H., AND SCHRADER, A. L. 634.11: 581.162.3
Comparison of certain varieties as pollenizers for the Delicious apple.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 87-90, bibl. 2.
Trials in Maryland indicate that Rome Beauty, Jonathan and Gallia Beauty are superior as pollenizers for Delicious to Golden Delicious and York Imperial.

1235. McDANIELS, L. H. 634.22: 581.162.3
Notes on the pollination of the Italian prune.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 84-6, bibl. 3.
The Italian prune is partially self-fruitful, but the set can be improved by providing means of cross-pollination.

1236. FILMER, R. S. 638.12
Preparing bees for winter.
Circ. New Jer. agric. Exp. Stat. 424, 1942, pp. 4.
Package bees. 638.12
Circ. New Jer. agric. Exp. Stat. 426, 1942, pp. 4.

Growth and nutrition.

1237. RUBIN, B., AND SISSAKIAN, N. 634.11: 581.144.4
Some peculiarities of the enzyme system of apple leaves and their physiological importance.
C.R. Acad. Sci. U.R.S.S., 1939, 25: 293-7, bibl. 7.
A consideration of the peroxidase and invertase content of apple leaves and their variation according to age, earliness and lateness of varieties and the use of mentors.

1238. SCOTT, D. M., WAUGH, J. G., AND CULLINAN, F. P. 634.25: 1.531
An injurious effect of peach juice on germination of the seed.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 283-5, bibl. 3.
It is found that peach juice contains some element which destroys viability in the seeds if brought in contact with them. Hence the pits should be separated from the pulp as soon as possible. The element is of a volatile nature and can be extracted by ether from peach juice.

1239. BROOKS, R. M. 632.11: 634.21 + 634.22
Climate in relation to deciduous fruit production in California. II. Effect of the warm winter of 1940-41 on apricot, plum and prune varieties in Northern California.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 209-11, bibl. 2.

The very mild winter of 1940-1 in Northern California was followed by an abnormal dropping of flower buds early in 1941 with resulting poor crops of apricots, plums and prunes. Notes were made of the incidence of bud drop in the commercial varieties in the variety collections of the University of California, Davis, and the varieties are grouped according to their inclination to drop.

1240. TUKEY, H. B. 631.547.6: 634.11 + 634.13 + 634.25 + 634.23
Time interval between full bloom and fruit maturity for several varieties of apples, pears, peaches and cherries.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 133-40, bibl. 11.

Dates of full bloom and maturity are recorded over a large number of years—in most cases—for 61 apple, 15 peach, 46 cherry and 14 pear varieties at Geneva, N.Y. The data vary considerably in the amount recorded for each variety and that fact must be remembered in interpreting them.

Comparisons are made between data for elapsed interval, i.e., interval between blossoming and fruit maturity, and calendar date, between the elapsed interval for different fruits, of similar data from other places, of data from seasons of early bloom with those of seasons of late bloom, of early maturing and late maturing varieties. The effect of local climate on such phenomena as spread of bloom is noted. Finally it is suggested that orchard operations such as thinning, irrigation, spraying, etc., might well be based on stages of development in fruit rather than specific dates.

1241. HALLER, M. H. 634.11-1.547.6
Days from bloom as an index of maturity for apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 141-5, bibl. 5.

Trials in Maryland and West Virginia show that the number of days from bloom to maturity has been fairly constant over three seasons for Williams (70 days), Jonathan (130 days), Grimes Golden (135 days) and Yellow Newtown (150 days) apples and is more reliable as an index of maturity than the pressure test, ground colour, seed colour and starch test. Optimum maturity for harvesting will be slightly later than this in all cases. Further trials at different centres are arranged in which the possible influence of certain climatic or cultural conditions on the number of days from bloom to maturity will be tested.

1242. STRUCKMEYER, B. E., AND ROBERTS, R. H. 634.11: 581.145.1
Investigations on the time of blossom induction in Wealthy apple trees.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 113-9, bibl. 6.

Blossoms from on-year Wealthy trees and 85% of the leaf area from off-year trees was removed. If blossoms were removed before full bloom, larger leaves were produced and some blossom buds were differentiated. The reduction in leaf area on early defoliated spurs inhibited the formation of blossom buds. Spurs defoliated at the time of full bloom and 2 weeks afterwards produced new leaves and some blossom buds. Those defoliated 3 weeks after full bloom did not form new leaves and the buds formed were vegetative. Spurs defoliated 5 weeks after full bloom formed a number of blossom buds. Induction had now progressed to the extent that total leaf area was no longer essential to the formation of blossom buds.

1243. CAIN, R. F. 581.11: 634.25 + 634.3
Comparative transpiration rates of peaches and citrus.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 79-83, bibl. 10.

Differences in transpiration phenomena in two-year-old varieties of peach, Valencia orange and Marsh Seedless grapefruit trees grown in cans were noted and are briefly discussed.

1244. BAKER, G. A. 634.25: 581.3
Mathematical model of embryo abortion in Phillips Cling peaches.
J. agric. Res., 1942, 64: 173-8.

A mathematical model of embryo abortion in Phillips Cling peaches has been constructed. Observed facts seem to indicate the efficacy of the proposed model. The probability distribution of abortion may be one-humped or two-humped. One hump is always associated with pit hardening. The gumming of Phillips Cling starts about 11 days after pit hardening and hence occurs about 11 days after abortion begins. The probability of gumming parallels the probability of abortion at least when $p(t)$ is one-humped and perhaps so or nearly so when $p(t)$ is two-humped. [Author's summary.]

1245. GAYNER, F. C. H. 634.13: 581.145
Studies in the non-setting of pears. VII. The growth cycle and fruit bud differentiation of Conference and Doyenné du Comice. *J. Pomol.*, 1942, 20: 24-39, bibl. 24.

Two years' observations on initially 18-year-old Conference and 17-year-old Comice trees on quince A and quince C stocks at East Malling are recorded and discussed. Among general facts discovered Comice was found to have a longer growing season than Conference. Trees on quince A made more growth than those on quince C. There were more leaves per primary spur (leaf bud growth) than on secondary ones (flower bud growth). Primary spur leaves also unfolded earlier than secondary ones. The date of differentiation of flower buds was determined in both years by dissection, division and serial sectioning of presumed flower buds. It was found that Conference buds began to differentiate at the end of June, nearly 8 weeks after spur growth had ceased, and those of Comice at the end of July, twelve weeks after the end of spur growth. The development of the flowers is illustrated by photomicrographs.

1246. HARLEY, C. P. 634.11: 581.14
Seasonal growth and dry matter accumulation in Winesap apples. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 165-8, bibl. 3.

FRENCH, A. P., AND SOUTHWICK, L. 634.11: 581.45
Further observations on a narrow-leaf variation of the apple. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 245-7, bibl. 1.

PICKETT, B. S. 634.25: 581.145.1
Initiation of peach flower parts. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 111-2, bibl. 5.

BAILEY, J. S., AND FRENCH, A. P. 634.25: 581.46
The inheritance of blossom type and blossom size in the peach. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 248-50, bibl. 7.

BLAKE, M. A. 634.25: 581.145.2
Additional studies of the acidity and tannin content of mature peach fruits. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 153-6, bibl. 1.

DAVIS, L. D. 634.25: 581.145.2
The relation between diameter and fresh weight of developing peach fruits. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 146-52, bibl. 3.

HARTMAN, F. O., AND MOWLETT, F. 634.11-1.523
An analysis of the fruit characteristics of seedlings of Rome Beauty, Gallia Beauty and Golden Delicious parentage. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 241-4, bibl. 3.

Manuring, soils and cultural practice.

1247. CORBAZ, J., AND DESHUSSES, L. A. 634.1/2-1.8
La fumure des arbres fruitiers. (Manuring of fruit trees.) *Rev. hort. Suisse*, 1942, 15: 103-7.

The manuring of fruit trees is discussed. In spring especially the trees require manure, organic or chemical, which should in grass orchards not be broadcast but inserted in the soil under the perimeter of the branches to a depth of 30 to 40 cm. This can be done by placing the manure in a

furrow ploughed round the tree or in holes 1 m. apart made with a spade, in each case covering in afterwards, or better still the manure can be injected into the soil by pressure pump and lance at the rate of 1 to 2 litres per hole. In gardens where the trees are in bare soil the manure can be broadcast and forked in. Manure spread on the surface moves downward very slowly and may be long in reaching the feeding roots. Whether the application should be an annual one or at longer intervals depends on the richness of the soil. Formulae are given to suit various types of soil and the different seasons of the year.

1248. ST. JOHN, J. L., OVERHOLSER, E. L., AND OVERLEY, F. L. 631.8: 634.11: 581.192
Effect of orchard fertilizer applications on the composition of apples. *Plant Physiol.*, 1942, 17: 435-46, bibl. 9.

Examinations were made over a period of six years of Jonathan and Winesap apples taken from the different fertilizer plots of the Washington experiment station. Pullman. Variations in the mineral and nitrogen content of the apples were comparatively small. It was found that increases in terminal growth and fruit production oppose increases in N, P and K content in the apples as the result of the fertilizers applied. Since increases in growth production resulted primarily from the addition of nitrogen, applications of this element, alone or in combination, generally resulted in reduced percentages of N, P and K in the fruit. Some tendencies observed in one year or with Winesap were not observed in other years or with Jonathan. It is pointed out that P and K were probably not deficient and that the effects of the fertilizer applications on the mineral and carbohydrate composition of the apples might be more marked if the trees were grown on a soil in which one or both of these elements were deficient, or if much larger amounts of fertilizers involving "luxury" consumption were applied.

1249. SEREDA, S. E. 631.8: 634.1/7
The deep placing of manures as a method of increasing the yield of fruit. *Sady i Ogorody*, 1941, No. 4, pp. 17-20.

Among the methods described for bringing fertilizers more directly and intimately in contact with the roots was one in which a solution containing NPK was poured into holes in the ground near the roots 40 to 50 cm. deep. Another method was to dig a trench, 50 cm. deep and 35 cm. from the trunk, round each tree. Fertilizer (preferably in liquid form) was introduced at more than one depth, after which the trench was filled up. Holes could be pierced in the bottom of the trench to facilitate penetration. These methods resulted in greatly increased yields. A machine has been devised which lays down a ribbon of fertilizer at a depth of 65 cm. The ribbon should be laid in two directions so that each tree may have manure applied all round it. It is suggested that in the absence of this machine furrows may be ploughed, twice if necessary to attain the right depth, and then covered in again after receiving the fertilizer. In combination with holes in the ground, such trenches and furrows enable fertilizers to be applied directly to the roots during the growing season. Another method of applying fertilizers in autumn is to dig 4 to 8 furrows running radially from the trunk, between the main roots.

1250. BURRELL, A. B., CAIN, J. C., AND BRINKERHOFF, L. A. 634.11-2.19-1.83
Response of apple trees to potash in the Champlain Valley. II. A third-year growth response and a first-year reduction in leaf scorch. *Proc. Amer. Soc. hort. Sci. for 1942*, 1942, 40: 8-12.

In trials in Champlain County, N.Y., leaf scorch was much reduced in the second year and increased growth resulted in the third year from heavy annual applications of potash to the soil in the case of 9-year-old apple trees very deficient

in potash. In another trial with 6-year-old trees heavy application just before bloom greatly reduced leaf scorch in the current year. Results were similar whether muriate or sulphate was used and whether it was broadcast on a wide or restricted area. Spraying the foliage with 1% K_2SO_4 gave the appearance of quicker control of scorch, but this did not persist through the season.

1251. LILLELAND, O., BROWN, J. G., AND CONRAD, J. P. 634.1/5-1.85
The phosphate nutrition of fruit trees. III. Comparison of fruit tree and field crop responses on a phosphate deficient soil.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 1-7, bibl. 10.

On the Aiken clay loam at Paradise, Calif., 18 different annuals failed to make satisfactory growth unless phosphate was added. Various established fruit trees, however, showed no response to phosphates and grew and cropped well. It would appear from this that annuals are incapable of indicating the phosphate needs of fruit trees.

1252. BOYNTON, D., AND CAIN, J. C. 634.11: 581.144.4: 631.55
A survey of the relationships between leaf nitrogen fruit color, leaf color and per cent of full crop in some New York McIntosh apple orchards, 1941.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 19-22, bibl. 2.

From the data recorded here it is obvious that more information must be accumulated on the effects of soil, season, crop, and sprays, etc., on leaf nitrogen, yield and colour before leaf nitrogen analysis can have practical utility for diagnosis.

1253. BATJER, L. P., AND HALLER, M. H. 634.11-2.19: 546.27
Fruit maturity and growth of apple trees as affected by boron content. (Preliminary report.)
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 29-30.

Early colouring and drop, coupled with more breakdown and less scald in store indicated that borax treatment of trees not definitely deficient in boron advances fruit maturity

1254. HENDRICKSON, A. H., AND VEIHMAYER, F. J. 634.1/2-1.432.2
Readily available soil moisture and sizes of fruit.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 13-8, bibl. 3.

Sizes of fruit and yield obtained at Davis, Calif., with Bartlett pears, Phillips Cling peaches and French prunes show that soil moisture is readily available between the moisture equivalent and the permanent wilting percentage. Weights of various sizes of pears, peaches and prunes from trees kept supplied with readily available soil moisture were related to the total number of fruits on the trees and not to the different soil moisture conditions.

1255. DAVIDSON, O. W. 634.11-1.4
Apple soils and their management in South Jersey.
Circ. N. Jer. agric. Exp. Stat. 425, 1942, pp. 8.

Experience shows that the management of apple soils must differ according to the soil. On New Jersey good soils showing a surface composition of sandy loam to loam with or without much gravel, overlying 2 feet of well aerated and well drained material, only a minimum of cultivation is necessary. On fair soils consisting of more sand and less loam, overlying only about 10-12 inches of well aerated heavier material, somewhat heavier manuring is necessary. They seldom allow of sod culture with mulch or at least partial tillage. On poor dry soils overlying material little heavier than the top soil droughts are very serious and only cultivation with annual cover crops or a combination of mulch, cultivation and annual cover crops appear to be

satisfactory. On poor wet soils ranging from sand to clay loam but containing a poorly drained or poorly aerated area in the top 2 or 3 feet mulching can only be effective in the earlier years. On the whole they are better not planted with apples. The application of the practice suggested in each case is described.

1256. OLNEY, A. J., AND ARMSTRONG, W. D. 634.25-1.874
The response of peaches in Kentucky to cultivation and cover crops and to sod cultures.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 123-5.

In trials at Princeton, Ky, over a number of years cultivation and cover crops resulted in larger trees and crops of peaches during the early years of the orchard. On level ground these methods continued to succeed, but on gently sloping land, whereas peaches under sod culture maintained vigour and cropping, those under cultivation progressively declined and soil erosion took place.

1257. POTTER, J. M. S. 634.11-1.542
Pruning apples.
J. roy. hort. Soc., 1942, 67: 243-7.

Practical information is given on various types of pruning which can be applied to apples. (1) The so-called leave-alone pruning; (2) Lorette system; (3) spur pruning. The note on (1) consists chiefly in pointing out its disadvantages in the small gardens for which the article is written, but careful and concise descriptions and explanations are provided for (2) and (3).

1258. BALLANTYNE, J. A., AND HORTH, C. J. 634.25-1.542
Winter pruning of canning peaches.
Agric. Gaz. N.S.W., 1942, 53: 228-34.

Methods of winter pruning canning peaches in the Murrumbidgee Irrigation Area are described and recommended and certain malpractices which will have an ill effect on quantity and quality of future production are pointed out. Attention is paid to the special requirements of certain of the leading varieties. There are 21 illustrations.

1259. SCHULZ, F. 634.1/2-1.546
Der Dahlemer Zweigkrümmer—eine wertvolle Neuerung. (The Dahlem branch twister—a useful novelty.)
Blumen u. Pflb., 1941, 45: 220-1, from abstract Forschungsdienst, 1942, Vol. 13, abstr. p. 91.

Information is given of an instrument whereby the troublesome bending down of the branches necessary for the formation of the so-called spindle bush method of training fruit trees [see H.A., 8: 703] is done very much more quickly than was hitherto possible. It is best used a few weeks after the beginning of the growing season.

1260. BROWN, G. G. 634.11-1.542.27
How long does the influence of thinning Yellow Newtown apple trees last?
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 99-102, bibl. 4.

Results of trials in Oregon indicate that heavy early fruit thinning of biennial bearing Yellow Newtown apples during the on-year not only induces nearly uniform annual bearing, but also persists in its effects for several years. The relations of bulk blossom and bulk calyx thinning to annual bearing are discussed.

1261. FRASER, H. 634.1/2-1.542.27
Fruit thinning.
Gärners' Chron., 1942, 111: 271-3.

In this article the thinning requirements of certain apples and pears and of plums in general are discussed.

1262. HOFFMAN, M. B. 634.11-1.542.27
Thinning Wealthy apples at blossom time with a caustic spray.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 95-8, bibl. 4.

Trials at Ithaca show that 0.2 Elgetol spray (said to contain the sodium salt of dinitro-cresol) can safely and successfully be applied to fairly healthy Wealthy apple trees to reduce the set of fruit at blossoming time. It is thought that the foliage of certain other varieties might be more susceptible to damage.

1263. COLE, C. E. 634.11-1.542.27
Blossom-killing sprays for apple trees.
J. Dep. Agric. Vict., 1942, 40: 359-62, bibl. 1.

Where owing to war conditions orchards cannot be cultivated or harvested the use of blossom killing sprays is advocated in order to destroy the crop which would otherwise serve as a breeding ground for pests. The sprays will kill all blossom and any young foliage that may be in evidence but will not injure the bark. Treated trees set a very heavy crop the following year, therefore pruning should be more severe than normal to reduce this. Spraying should begin when 5% of the blossom is fully open, except in the case of long lateral growths which open their buds much later than typical spur buds. Varietal differences mainly affect the amount of spray required for thorough wetting of the clusters. The materials discussed are (a) Cresylic acid 1-1½ gal. per 100 gal. water. This can be improved by emulsifying with soft soap at the rate of 3 lb. soap boiled in 1 gal. water for each gal. undiluted acid. Use at the rate of 2-2½ gal. per 100 gal. of spray. (b) Tar distillate, 3 gal. per 100 gal. spray. (c) Di-nitro-cresol (DNC) 1½-2% of the oil preparation. This gives slow action but less foliage injury than tar distillate. The author is not enthusiastic over the use of these sprays to control biennial bearing or for thinning. In recent experiments cresylic acid controlled woolly aphid but not black spot; tar distillate controlled black spot but not woolly aphid and the leaves of the trees were a deep healthy green. Two per cent. cresylic acid injured certain Jonathan trees, the new growth bearing irregular yellow blotching on the leaves, of a type known as infectious leaf variegation.

1264. POLJAKOV, N. K. 634.11-1.55
Results of experiments to eliminate biennial bearing in apples.
Sady i Ogorody, 1941, No. 5, pp. 10-2.

The alternation of high and low yields of fruit is attributed to wasteful expenditure of nutrients which, instead of being utilized by the tree for steady fruit bearing from year to year, go to form fruit buds in numbers far in excess of the needs of even an adequate yield of fruit. Experiments were accordingly carried out which proved that such alternation could be eliminated by the use of sprays, or by hand-picking, for the removal of superfluous fruit buds and flowers. The method of hand picking was found to be laborious, but that of spraying certain chemical solutions on the flowers of secondary and tertiary branches produced satisfactory results, damage to foliage could be avoided, and the trees bore steadily and, on the average, produced larger yields of fruit than hitherto. In the experiments the effects of spraying at the beginning, during and towards the end of flowering were tested. Of the chemicals used, the most effective were bordeaux mixture and 2% and 4% solutions of each of the following: green [soft ?] soap, iron sulphate and barium chloride.

1265. HESSE, C. O., AND DAVEY, A. E. 577.15.04: 634.25 + 634.21
Experiments with sprays in the control of fruit drop of apricot and peach.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 55-62.

Results of spraying peach and apricot trees at Davis, Calif., varied considerably. The most marked difference in

results from those with apple were that response to spraying Stewart apricots was not apparent till a week or ten days after treatment. After this period the length of activity varied but was apparently dependent on concentration and possibly thoroughness of application. Spraying did not greatly affect the abscission of normal Elberta fruits nearing maturity, whereas it did very strongly affect the abscission of immature apricot fruits about to drop presumably because of an associated embryo abortion. In neither case did spraying appear likely to be economical.

1266. (i) HEINICKE, A. J., REUTHER, W., AND CAIN, J. C. 634.11-1.55: 546.27
Influence of boron application on preharvest drop of McIntosh apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 31-4, bibl. 5.

- (ii) HOFFMAN, M. B., EDGERTON, L. J., AND VAN DOREN, A. 577.15.04: 634.11
Some results in controlling the pre-harvest drop of apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 35-8, bibl. 4.

- (iii) SOUTHWICK, L. 577.15.04: 634.11
Further studies on the control of pre-harvest drop of McIntosh.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 39-41, bibl. 2.

- (iv) MURPHY, L. M. 577.15.04: 634.11
Further studies with pre-harvest sprayed McIntosh apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 42-4, bibl. 3.

- (v) BATJER, L. P. 577.15.04: 634.11
Temperature in relation to effectiveness of pre-harvest drop sprays on apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 45-8.

(i) Trials at Ithaca indicate that an excessive preharvest drop of apples may be associated with early stages of boron deficiency, not severe enough to cause cork spot.

(ii) Trials on Williams Early Red apples at Ithaca with naphthaleneacetic acid in both liquid and dust form indicated that dust can be just as effective as spray in checking fruit drop, but that unless suitable dusting apparatus is used its use may be very wasteful.

(iii) When equivalent amounts of the active ingredient (proprietary articles) were used, dusting was not found so effective as spraying in checking fruit drop of McIntosh apples in trials by the Massachusetts experiment station.

(iv) Spraying with 5 p.p.m., with 10 p.p.m. and twice with 5 p.p.m. of naphthaleneacetic acid solution all successfully checked fruit drop in McIntosh apples at Kingston, R.I.

(v) Trials at Beltsville, Ind., indicate that naphthaleneacetic acid applied at midday at relatively high temperatures was more effective at certain concentrations—below 5 p.p.m. in the case of Williams apples and both at 2.5 and 5 p.p.m. for Delicious and Winesap—than when applied in early morning of the same day under cooler conditions.

1267. VYVYAN, M. C. 634.11-1.55: 577.15.04
Further note on the reduction of pre-harvest drop in apples by use of dilute sprays of alpha-naphthalene acetic acid.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 38-40, bibl. 2.

Trials by Haddow and by Shear indicate the extreme improbability of any danger to the eater from spraying fruit with growth substances to prevent fruit fall. In further* trials by Vyvyan* the spraying of Miller's Seeding apples with 5 p.p.m. and 10 p.p.m. naphthaleneacetic acid on 7 August, i.e. 21 days before the untreated trees were picked, resulted in a marked retention of fruit on the trees, the

* See *Ibidem* for 1940, A24, pp. 46-9; H.A., 11: 1126.

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reduction in drop being thoroughly significant even after 28 August, i.e. more than 3 weeks after date of spraying. In view of the low cost of the materials used and the saving of marketable fruit the author considers that spraying with a 5 p.p.m. solution would be well worth while, the total cost of spraying an acre, including labour, amounting to less than £2.

1268. DAVEY, A. E., AND HESSE, C. O.

577.15.04: 634.13

Experiments with sprays in the control of pre-harvest drop of Bartlett pears in California.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 49-53, bibl. 2.

Experiments in Santa Clara County in 1940 and 1941 and in Lake County in 1940 show that a reduction in pear drop of some 50% or more could be achieved by spraying with naphthaleneacetic acid, naphthalene acetamide at 5 or 10 p.p.m. or a proprietary article such as Fruitone. A period of 3-4 days or more was necessary for the treatment to take effect.

1269. LOTT, R. V. 634.11-1.55

Early picking of Yellow Transparent [apple] results in low yield and poor quality.
News Lett. Ill. St. hort. Soc., 1942, No. 4, pp. 2-4.

Data are presented to show that Yellow Transparent apples picked at the 2½-inch size were 150% and at the 2¼-inch size

125% heavier than when picked at the usual 1½-inch diameter. At the heaviest size the fruit was still firm enough to handle. The small green size being on the market early in July normally fetches high prices but under present economic conditions this may not be so in view of the large amount of sugar required to make them palatable. A fairly reliable maturity test is by flesh colour which changes with age from green through greenish white to white. The fruit should be picked in the two last stages.

1270 KNIGHT, A. T. 634.1/2-1.432.3: 581.144.2

The influence of porosity of some orchard soils upon root behavior.

Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 23-6, bibl. 4.

Alfalfa was the experimental material.

CLEGHORNE, J. W. 631.459

Maintenance of soil erosion dams.

Fmg S. Afr., 1942, 17: 378, 408.

MCDIARMID, R. W. 631.459

Gully reclamation. Experiences at Cowra Experiment Farm.

Agric. Gaz. N.S.W., 1942, 53: 208-10.

MAINE AGRICULTURAL EXPERIMENT STATION.

631.8

Official inspections 181. Commercial fertilizers 1941; 1941, pp. 64-109.

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1271. GRUBB, N. H. 634.711

Raspberry planting: some notes on varieties.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 52-3.

Notes on 13 raspberry varieties recommended [and not recommended] for planting.

1272. AMOS, J., HATTON, R. G., AND HOBLYN, T. N. 634.723

How to improve black currant plantations.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 53-6.

Among recommendations made are the following:—Choose black currant varieties suited to environment and market requirements. Plant only cuttings from clean bushes in plantations annually rogued for reversion and sprayed to control big bud. Soil for black currants must be of good moisture-holding capacity. Shelter should be afforded against north-east winds. Ample space should be left between rows for cultivation. Generous nitrogenous manuring is desirable and dung if obtainable. Potash may be necessary for the Goliath group on some soils. Pruning should aim at maintaining a good supply of young cropping wood. Regular roguing and spraying with a routine 2% lime-sulphur wash just before blossoms open, except for varieties of the sulphur-shy Goliath group, are strongly recommended. The control of the green capsid bug (*Lygus pabulinus*) by a dinitrocresol or tar petroleum wash is also urged.

1273. ROGERS, W. S. 634.75

Strawberries: making the most of a limited acreage.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 56-60, bibl. 11.

The chief strawberry varieties recommended for English growers at present are Royal Sovereign, Sir Joseph Paxton, Huxley, Mme. Lefebvre and Tardive de Leopold. Of these

the first two are susceptible to virus (yellow edge and crinkle) and can be planted together, but should be kept well away from the others, of which Huxley and Lefebvre are carriers and Tardive de Leopold is intermediate. The aphid, chief carrier of virus, can be easily controlled on runners by dipping before planting in a dip consisting of nicotine 1 oz., soft soap 1 lb., water 12½ gallons. Mites, if present, can be controlled by hot water treatment (see H.A., 9: 445). Optimum planting distances will vary, but on medium loam in Kent distances of 12 in. in the rows and 30 in. between rows are recommended. Autumn planting is preferable where possible, but planting should be delayed till spring once the soil temperature falls below 45° F. Deblossoming the first season results in a more than double crop the second season, though for first quality dessert fruit the first season fruit is the best. To avoid spring frost damage straw over the plants—removed in the daytime—is beneficial, but straw should not be tucked under the plants until frost is no longer expected. Good manuring is desirable. Experiments indicate that liming is generally of little importance except in extreme cases, and there is evidence that the importance to strawberries of soil lime content lies mainly in its effect on availability of other nutrients. Irrigation in early summer will in dry seasons produce useful crop increases.

1274. PHILOSOPHOVA, T. P. 634.75-1.523

Bridging species method in hybridization of the garden strawberry, *F. grandiflora*, with other *Fragaria* species.

C.R. Acad. Sci. U.R.S.S., 1941, 31: 924-6, bibl. 16.

1275. GOLLMIK, F. 634.8: 581.162.3

Über die Lebensdauer des Rebenpollens. (Length of life in vine pollen.)
Angew. Bot., 1942, 24: 221-32, bibl. 21.

In work at Naumburg it was found that vine pollen would keep best in an atmosphere showing 40-50% moisture.

It was found possible to keep pollen viable by storing at 1° C. and at this humidity until the following time of blossoming. Pollination experiments with pollen so stored were successful and resulted in seed from which in a few cases (4 out of 89 originally pollinated) apparently normal plants were derived. A new method of storing vine pollen for breeding work is thereby suggested.

1276. DE CARVALHO E VASCONCELLOS, J., SANTA BARBARA, L., AND BAPTISTA, A. 634.851
Castas de videira. Seu estudo botânico.
(The botanical study of vine types.)
Rev. agron. Lisboa, 1941/2, 29: 177-227.

The need is urgent for an ampelography for the accurate identification of Portuguese vine types of which there are some 1,200 names. The authors made a complete study of 100 of these, the methods used, the data obtained and a classification being recorded in this paper. Identification is based on the twigs, characters of inflorescence, stipules, tendrils, the shoot from its extremity to the 5th node and the young and mature leaves. As regards leaves various linear and angular measurements of the nerves are considered as well as the relative dimensions of the leaf.

1277. DE CARVALHO E VASCONCELLOS, J., SANTA BARBARA, L., AND BAPTISTA, A. 634.851
Castas de videira. Seu estudo botânico.
(The botanical study of vine types.)
Rev. agron. Lisboa, 1941/2, 29: 353-403, 486-523.

An ampelography of a selection of the vines grown in Portugal. The two sections noted above deal with white grapes arranged alphabetically.

1278. AMERINE, M. A., AND WINKLER, A. J. 634.851: 581.192
Maturity studies with California grapes. II.
The titratable acidity, pH, and organic acid content.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 313-24, bibl. 31.

Data are presented and discussed for 11 *vinifera* varieties of grape grown in California.

1279. OLMO, H. P. 634.8: 581.48
The use of seed characters in the identification of grape varieties.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 305-9, bibl. 5.

COSMO, I. 634.872-1.541.11 + 1.542
Portinnesti, sistemi di potatura e zone più indicate per la coltivazione di uve da tavola nelle Venezie. (Rootstocks, methods of training and districts especially suitable for the cultivation of table grapes in the province of Venice.)
Ital. agric., 1942, 79: 403-12.

- WILSON, J. 634.8
Grape growing without artificial heat.
J. roy. hort. Soc., 1942, 67: 305-6.

1280. LUCKAN, F. 634.51-1.534
Selbstbewurzelung von Walnüssen. (How to root walnuts.)
Gartenbauwirtsch., 1941, 58: 24: 4, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 42.

Walnut layers can be made to root by wiring the young summer shoots. It is essential to success that at least one shoot shall be left unwired. Plants which refuse to root by layering thus can be twinned by splitting.

1281. ROMBERG, L. D. 634.521-1.535
Use of stem seedlings in propagating the pecan from nut cuttings.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 298-300, bibl. 3.

The author, having experienced difficulty in getting cuttings of pecan to grow into trees, devised a method whereby cuttings from 1-year-old pecan twigs were temporarily grafted to young pecan seedlings grown in cans in the field, either by slot graft or by inarching. The process is described. Even so, the production of shoots was more easily achieved than that of roots. It is thought that the use of growth substances might improve rootgrowth.

1282. PYKE, M., MELVILLE, R., AND SARSON, H. 634.51: 577.16
Vitamin C in walnuts.
Nature, 1942, 150: 267-8, bibl. 5.

The fact that the cultivated edible walnut contains 1,000-3,000 mg. of vitamin C per 100 g. appears to have been overlooked in English-speaking countries, though not in Germany and Russia. The content is highest just before the formation of the shell, when the kernel is still soft. The vitamin is destroyed by the processes involved in pickling if they consist of pricking, brining, exposure to sunlight or steaming but if pickled by either of the two methods published by Mrs. Hannah Glasse in the eighteenth century the whole of the vitamin is retained. Recipes for white and green pickled walnuts causing no loss of vitamin are given [presumably derived from Mrs. Glasse.—Ed.] also receipts for walnut marmalade, walnut and blackcurrant jam and walnut and tomato chutney in which a large part of the vitamin is retained. One walnut weighing 15 gm. will produce at least twice the maximum daily requirement of vitamin C. Comparisons are made with the vitamin C content of other nuts in a similar degree of unripeness: In no case is the high content of the walnut approached.

1283. PASCUAL, A. 634.55
Almond growing throughout the world. (3) The United States.
Int. Rev. Agric. Rome (Mon. Bull. agric. Sci. Pract.), 1942, 33: 165T-70T.

The information given appears to be based on various bulletins issued by the Californian agricultural Experiment Station notably *Circ. Calif. agric. Ext. Serv. 103 of 1937 (H.A., 8: 71)*.

1284. CHELIADINOVA, A. I. 634.58: 614.014.44
Influence of temperature on the response of *Arachis hypogaea* L. to day length.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 55-7, bibl. 5.
Influence of illumination intensity upon the response of peanuts to day length.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 276-8, bibl. 1.

In trials at Leningrad and Krasnodar there was little difference either in time of flowering or number of flowers formed whether peanuts were submitted to long or short photoperiods, i.e. 24, 10 or 6 hours of light, but the proportion of flowers setting fruit was always higher under short day conditions. The ratio of fertilized flowers also increased with higher temperatures during growth, in fact the temperature factor was of more influence than that of day length.

In the second paper tests are reported of the effect of different lengths and strengths of illumination, the strength being varied by gauze shields. The oil content of the nuts was found to be greater under conditions of less intense illumination, especially under ordinary day length conditions. This suggests the advisability of closer planting or interplanting with such other crops as maize, millet or potatoes.

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1285. JOHANSSON, E. 632.111: 634.1/2
Frostskador i svenska fruktträdgårdar vintern
1939-1940. (Frost damage in Swedish orchards
in the winter of 1939/40.) [English summary
1½ pp.]
Reprinted from *Ärsskr. Alnarps Lantbruks-Mejeri
Trädgårdst.*, 1941, as *Meddel. Stat. Trädgårdst-
försök* 12, 1941, pp. 23, bibl. 8.

This account of frost damage to Swedish top fruits in the winter of 1939/40 is based on numerous reports from growers and advisory officers. A tentative classification is made and presented of the chief varieties of apples, pears and plums according to their hardness as shown in that winter. Among varieties known in England apples are classed as follows:—*hardy*, *Walthey*; *fairly hardy*, Cox's Orange, Cox's Pomona, James Grieve, Ribston; *not hardy*, Belle de Boskoop, Bramley, Gravenstein. Pears:—*hardy*, Doyenné du Comice; *fairly hardy*, Williams', Louise Bonne; *not hardy*, Alexander Lucas. Plums:—*hardy*, Altham's Reine Claude, Jefferson; *not hardy*, Czar, Oullin's Gage, Rivers' Early and Victoria. The following conclusions are reached:—Hardiness is particularly affected by the yield in the previous year, the greater the crop the greater the damage. Trees in grass were often found to be harder than under cultivation, cover crops having much the same effect as grass and hence being preferable to it as not restricting tree growth so much. Reports do not contradict the view that a high nitrogen content in the soil reduces hardness. Cold north winds had bad effects in some districts. Hard summer pruning reduced hardness in Czar, Reine Claude, d'Oullins and Victoria plums. There were indications that apples on EM XIII and XVI stocks are less hardy than those on EM IV. [From author's summary.]

1286. FIELD, C. P. 634.11-2.111
Low temperature injury to fruit blossom. II. A
comparison of the relative susceptibility and
effect of environmental factors on three commercial
apple varieties.
A.R. East Malling Res. Stat. for 1941, A25, 1942,
pp. 29-35, bibl. 7.

Blossom on twigs 4 to 12 inches long was cut from trees of Cox's Orange Pippin, Bramley's Seedling and Worcester Pearmain at East Malling. A pad of damp cotton wool was placed over the cut end of the shoot and the blossom was exposed on a table in constant temperatures ranging from 32° to 26° at the Ditton Laboratory for periods of 1, 2, 3, 6 and 12 hours. Observations were also made on trees growing in pots. There was considerable difference in the susceptibility shown by the three varieties, Bramley's being particularly susceptible, Worcester particularly resistant, and the author suggests the desirability of an intensive study of two such varieties to discover any morphological, anatomical or chemical differences in the flowers or foliage at the time of flowering, which might have an influence on their reaction to low temperatures. The injury followed a characteristic sequence from loosening of the ovary skin to a discoloration spreading from the styles to the ovules. Only when the damage was limited to skin loosening did fruit develop. Temperatures above 29° F. did not affect the flowers. Generally flowers were most affected in the green bud stage. There was no correlation between resistance and moisture content of the flowers. Humidity of the air and soil moisture had little effect on amount of damage, but wet flowers suffered more than dry. A single exposure to low temperature for 3 hours proved much more damaging than several short periods adding up to the same total with thawing intervals between. Blossoms hardened by exposure to 32° F. on the 4 nights before treatment were less damaged than others. Spraying with

cold water after freezing did not mitigate the damage but the introduction of glycerin by injection, absorption or spraying gave a measure of resistance up to 3 days from treatment.

1287. PICKETT, B. S., AND LANTZ, H. L. 634.11-2.111
Apple varieties: behavior of two hundred varieties
following the freeze of November 1940.

Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 212-4.

A record is presented of the recovery or injury of some 200 apple varieties at the Iowa Agricultural Experiment Station following the severe frost of 11-15 November 1940. Only 6 named varieties, viz. Anoka, English Russet, Malinda, Peter, Repka Malenka and Hiberna and 13 seedlings from various sources escaped all injury. Forty-five varieties and 4 seedlings were rated not worth saving owing to damage received, Grimes, Golden Delicious and the Red Delicious group being among them, with Jonathan among the severely crippled class. The varieties falling into the different groups are named.

1288. LANTZ, H. L., AND PICKETT, B. S. 632.111: 634.11-1.523
Apple breeding: variation within and between
progenies of Delicious with respect to freezing
injury due to the November freeze of 1940.

Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 237-40.

Data on the behaviour of the trees of 24 cross-bred progenies of Delicious apple during the November freeze of 1940 in Iowa appear to show (1) that hardy varieties transmit their hardness to a relatively high percentage of trees, even when crossed with such a tender variety as Delicious, and (2) that some of the progeny of seedling trees produced by crossing tender varieties may be harder than either parent.

1289. SCHMIDT, M. 634.1/2-2.111-1.541.11
Der Einfluss von Unterlage und Stammbildner
auf die Frostempfindlichkeit der Obstsorten.
(The influence of stock and intermediate on frost
resistance in fruit trees.)
Dtsch. Obstb., 1941, Hft 6, p. 101, also *Mitt.
Geisenheim* 56, 1941, Hft 8, pp. 89-94 from
abstract *Forschungsdienst*, 1942, Vol. 13, abstr.
p. 74.

The effects of the very hard winter of 1939/40 on various apple seedlings of Apfel aus Croncels and Baumanns Reinette and crosses between the two are noted and indicate that heredity has a great deal to do with hardness. Many varieties reacted very differently to frost in 1939/40 to what previous experience had suggested as likely. Factors tending to break down frost resistance in this year were the excessive harvest of 1939, insufficient ripening of the wood, the long, wet and relatively warm autumn, disease incidence and length of frost. On the whole the different rootstocks did not suffer much. Particular stocks did, however, appreciably affect the resistance of their scions. Thus the greatest loss occurred in apple trees on E.M. XVI rootstocks. Trees on V remained untouched. On E.M. III 90-5% Cox's Orange, 100% Belle de Boskoop, 100% Ontario and 77% Beauty of Bath remained uninjured, but on VI comparative figures were Cox nil, Belle de Boskoop 83-4%, Ontario 30% and Beauty of Bath 66-7%. The damage was particularly noticeable on the trunks. The fact that 50% of the trees in Altenland are worked on Belle de Boskoop as stock or intermediate is probably responsible for the fact that even frost-resistant varieties were frozen. On seedling stems on the contrary there was no injury. At Neustadt a.d. W. pears and cherries were less

harmful than apples and plums, at Naumburg a.s. pears proved much more susceptible than other fruits. In Altenland cherries suffered worst, apple and plums badly and pears much less. At Klosterneuburg near Vienna cherries suffered most and apples least. Generally speaking there was no damage to roots or to parts of the stem covered by snow. Among apples Ontario and Belle de Boskoop were damaged worst, Weisser Klarapfel and other early varieties less, Cronsels and others hardly at all. Among pears only the perry or cooking varieties proved hardy. Of cherries the sour cherries were less susceptible than the sweet, while Morello varied according to location. Nearly all plum varieties showed examples of extreme susceptibility to frost.

1290. BRIERLEY, W. G. 632.111: 634.11
A note of an unusual case of cold injury to the Haralson apple.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 236.

Following very heavy snow the lower scaffold branches of some of the Haralson apple trees split badly at the crotch. An attempt was made to prevent further damage by removing the snow, but the immediate result was an exposure of these branches within 2-3 hours from a temperature under the snow of 25-30° F. to one of -10° F. in the air. In the following May these branches were found to be dead, whereas those from which the snow had not been removed developed good foliage and set a fairly heavy crop.

1291. MANEY, T. J. 634.1/8-2.111
Fruit tree injury resulting from the Midwest blizzard of November 1940.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 215-9.

A blizzard characterized by torrential rain and very rapid falls of temperature to below 0° F. in November followed an exceptionally mild autumn in Iowa, Missouri, Nebraska and Kansas and was a major disaster to the horticultural community there. Nearly every fruit species except currants and gooseberries was more than slightly injured. Injury to ornamentals was worst in the evergreen class. In all fruit tree varieties there were trees so badly injured that not even from the apparently uninjured root parts was there any emergence of sprouts. A microscopic examination of injured tissues in different parts of the tree showed a general disruption of the cells of the cambial region. Of apple varieties Duchess, Yellow Transparent, Wealthy, Haralson and one or two others were uninjured, while Stayman, Delicious, Grimes and others were killed outright. Among forms of injury were the killing of terminal growth of 1, 2 and 3 years of age, killing outright or severe patch injury to lateral and main limbs, crotch injury and trunk injury in varying degree. Occasionally in some varieties like Jonathan the entire crotch and limb structure was uninjured, but the trunk was girdled by bark injury over 25-100% of its circumference. This serves to demonstrate the value of a hardy intermediate.

1292. KELLEY, V. W., AND McMUNN, R. L. 632.111: 634.1/8
November, 1940, cold damage to fruit plants in Illinois.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 220-4.

The sudden severe cold wave of 11-15 November, 1940, did great damage to fruit in Western Illinois. Lack of hardening off was largely responsible for the severity of injury. Thus little or no injury was experienced by plants which had dropped their foliage and were thus hardened off. Trunk tissue, which incidentally hardens off later than branch tissue, suffered more severely than limbs and buds. The wind also had a direct effect on the severity of the damage, possibly owing to its causing a very rapid loss of water on

the windward side of the trunks, which may have been great enough to kill the cells.

1293. LEWIS, D. 634.13: 581.163: 632.111
Parthenocarp induced by frost in pears.
J. Pomol., 1942, 20: 40-1, bibl. 6.

The author working at Merton was able to induce parthenocarp in Conference and Fertility pears by exposure to -5° C. for 18 hours at flowering time. This offers a possible explanation of the discrepancies between the results of different workers on self-sterility in pears. This cold-induced parthenocarp may also be of considerable importance in producing a crop of fruit in a cold spring, as shown by the high proportion of seedless fruits formed in some years.

1294. BROWN, D. S. 634.25-2.111
Note on winter injury to peach trees.
News Lett. Ill. St. hort. Soc., 1942, No. 4, p. 1.

Injury to peaches in Illinois diagnosed as winter injury is described. Flowers and some leaves were produced but they soon dropped. Principally at ground level and up to 6 inches below, though the injury sometimes extended also to the scaffold branches and entirely around the trunk, the outer bark, cambium and sapwood was brown and dead. The basal ends of larger roots were often injured. There was no bark splitting. Temperatures had fallen to -15° F. and there was no snow.

1295. HILDEBRANDT, B., AND MAURER, K. J. 634.1/4-2.111
Frostsicherer Obstbau. (How to avoid frost damage in the orchard.)
Trowitzsch, Frankfurt on Oder, 1941, pp. 87, 4.50 RM., from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 25.

Climate, heredity, place of origin, variety and breeding, rootstocks and double working, soil management, manuring and pruning all play their part in influencing frost hardiness in fruit trees and these factors are discussed in the bulletin under consideration.

1296. GRAY, G. F. 634.84-2.111
Resistance of grape varieties [American] to the freeze of November 1940.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 329-31.

1297. BUTLER, O. R., AND DUNN, S. 634.11-2.19
Studies on the bitter-pit disease of apples.
Tech. Bull. New Hamp. agric. Exp. Stat. 78, 1941, pp. 9.

The effect of different amounts of N, P, K and lime and mulching with hay on crop and bitter pit was observed in an orchard of Baldwin apple trees during the years 1924-33. Figures show that no combination of fertilizers was better than nitrogen alone as regards effect on yield. For reduction of bitter pit nitrogen and potash were not so good as nitrogen and phosphorus. Phosphorus reduced while potash and nitrogen increased its incidence. On the whole the presence of sulphur and phosphorus seemed to counteract the effects of nitrogen and potash. The addition of lime seemed to be without effect except when nitrogen alone was used. Mulching tended to increase yields but not to reduce bitter pit. Late compared with early harvesting helped to keep down bitter pit incidence in store.

1298. POTTER, M. C. 634.21-2.19
Apricots.
J. roy. hort. Soc., 1942, 67: 247-8.

A note records the death of 3 apricot trees in different parts of the country when about 15 years old. In each case this occurred after an exceptionally good crop. The explanation that the roots had reached uncongenial soil is considered inadequate and no other is offered.

1299. SNYDER, E., AND HARMON, F. N. 634.8-2.19: 546.47
Some effects of zinc sulphate on the Alexandria grape.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 325-7, bibl. 1.
Zinc sulphate solution (2 lb. zinc sulphate to 1 gal. water) brushed on the pruning cuts within an hour from pruning so that the fresh cuts were thoroughly wetted resulted in some cases in injury to the dormant buds but very greatly increased fruit yields in the Alexandria (Muscat of Alexandria) vine at Fresno, Calif. This indicates that zinc deficiency probably has something to do with poor setting of this vine.
1300. MAIER, W. 632.191
Was wissen wir heute von der Chlorose? (Our present knowledge of chlorosis.)
Forschungsdienst, 1942, 24: 149-69, bibl. 99.
The author, who is chiefly interested in vine chlorosis, tries not unsuccessfully to set out what is meant by the term chlorosis when applied to different phenomena. He deals with the causes of chlorosis under the following headings:—(1) Inherited chlorophyll defects as seen in such plants as *Coleus hybridus*; (2) infectious chlorosis caused by viruses; (3) chlorosis due to insect, fungus or bacterium; (4) chlorosis due to unfavourable weather conditions; (5) chlorosis due to soil conditions; (6) chlorosis due to deficiencies of: water, lime, magnesium, calcium, iron, manganese, boron, copper, sulphur and nitrogen; (7) chlorosis due to excess of: water, mineral nutrients from the soil, lime, iron, boron, manganese, copper; (8) chlorosis in grafted vines. References to articles dealing more fully with these different phenomena are given in all cases.
1301. BROOKS, F. T. 632.3/4: 631.521.6
Disease-resistant plants.
Endeavour, 1942, 1: 114-7.
Mention is made in this article of the following horticultural plants in which the breeder is building up or has been trying to build up immunity or resistance to the diseases named:—potato (wart, blight, virus); tomato (leaf mould); banana (Panama disease); cacao (witches' broom); snapdragon (rust).
1302. WORMALD, H. 632.3/4: 634.1/7
Notes on plant diseases in 1941.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 40-2.
Brief notes are given on the incidence of the following diseases:—brown rots, grey mould (*Botrytis cinerea*), *Armillaria mellea*, stalk end rot of apple (*Botrytis cinerea* and *Phoma* spp.), pear canker (*Nectria galligena*), blossom blight of pears (bacterial), blossom blight and leaf spot of morello, *Fomes pomaceus* on cherry, plum rust, dieback of black currants (possibly *Cytosporina ribis*), leaf spot of gooseberry (*Gloeosporium ribis*), leaf spot of *Rubus* spp. (*Gloeosporium venetum*), leaf blotch of strawberry, and *Corticium fuciforme* on cover crop grasses.
1303. JOHNSON, J. 632.8
Studies on the viroplasm hypothesis.
J. agric. Res., 1942, 64: 443-54, bibl. 10.
Inoculations with extracts from healthy plants into other healthy plants were made to test the hypothesis that the introduction of some part of the protoplasm of one species into the living cells of another species might bring about the abnormality known as virus disease. Out of 122 species of legume thus extracted and inoculated into bean plants and others results in 119 cases were negative. In one case, *Lathyrus tingitanus*, symptoms were regularly noted but are interpreted as an allergic response. In two other cases, i.e. *Lathyrus pusillus* and *Sesbania macrocarpa*, virus symptoms appeared but it is highly likely that the viruses pre-existed in the hosts.
1304. HILDEBRAND, E. M., AND CURTIS, O. F. 632.8
A darkening technique for inducing virus symptoms in mature as well as in growing leaves.
Science, 1942, 95: 390, bibl. 2.
It has recently been discovered that the device of excluding light from growing leaves into which it is desired that virus shall move not only shortens the incubation period (as do pruning, girdling, defoliation*) but also induces symptoms on shoots and leaves that are not growing. Darkening for 2 weeks induced within 6 weeks symptoms of yellow-red or X disease on growing peach seedlings 20 inches tall and branchless which had received a diseased bud midway on the stem, and on non-growing branched seedlings. In the last case the diseased bud was placed at the base of the branch. Thus it was possible to darken either budded or unbudded branches. Shading stops photosynthesis at the shaded part and favours a transport of carbohydrate to the spot. If this has to pass through a part of the stem containing the virus the latter is carried along with it.
1305. MASSEE, A. M. 634.75-2.8-7.53
Aphis transmission of strawberry crinkle in Great Britain.
J. Pomol., 1942, 20: 42-8, bibl. 14.
Transmission experiments at East Malling in 1937, 1938 and 1941 prove conclusively that the strawberry aphid (*Capitophorus fragariae*) is a vector of strawberry crinkle in Great Britain. Mild symptoms of crinkle were induced in healthy plants of the common woodland strawberry (*Fragaria vesca* L.) by transfer and feeding of either adult or immature stages of apterous, viviparous female aphides, previously fed on plants of the same species showing crinkle symptoms of like intensity. Severe and mild symptoms of crinkle, respectively, were induced in healthy Royal Sovereign plants by colonization with alate viviparous female aphides, previously fed on Royal Sovereign plants showing crinkle symptoms of corresponding intensity. [From author's summary.]
1306. COHEN, S. S. 633.71-2.8
The isolation and crystallization of plant viruses and other protein macro molecule, by means of hydrophilic colloids.
J. biol. Chem., 1942, 144: 353-62, bibl. 27.
1307. WORMALD, H. 634.25-2.3
Bacterial diseases of stone-fruit trees in Britain. VIII. Bacterial canker of peach.
Trans. Brit. mycol. Soc., 1942, 25: 246-9, bibl. 3.
An account of the discovery and identification by culture and re-inoculation of *Pseudomonas mors-prunorum* in a peach tree at East Malling.
1308. PEGLION, V. 634.25-2.42
Fattori ecologici e manifestazioni parassitarie anomale di *Taphrina (Exoascus) deformans* (Fuck) Tul. (Ecological factors and the different parasitic stages of peach leaf curl.)
Ital. agric., 1942, 79: 395-8.
The peach leaf curl fungus winters in the form of conidia on the branches. In the absence of copper it is suggested that formaldehyde solution (2%) or a polysulphide preparation of proper strength should prove efficacious in controlling them.
1309. WILSON, E. E. 634.2-2.41
Experiments with arsenite sprays to eradicate *Sclerotinia laxa* in stone fruit trees as a means of controlling the brown rot disease in blossoms.
J. agric. Res., 1942, 64: 561-94, bibl. 27.
No apothecial stage of *Sclerotinia laxa* has been found in California. The conidia produced by the sporodochia arising from blighted twigs and mummied fruits in the
* H.A., 1942, 12: 848.

winter appear to be the source of blossom infection in the spring. The trials described here indicate that the application of 2 to 24-100 calcium arsenite in mid-winter prior to pruning will in great measure either suppress the development of the fungus or kill it on development. This treatment is expected not to replace but to supplement spring treatment with bordeaux. Almond trees cannot stand arsenite treatment but it is satisfactory for apricots and plums.

1310. DENHAM, H., AND WORMALD, H. 634.21-2.8
The brown rot diseases of the apricot.

J. roy. hort. Soc., 1942, 67: 261-3, bibl. 2.

A cause of die-back in apricot is infection of twigs and branches by the brown rot fungus, *Monilia cinerea*. Infection results in blossom wilt, twig blight and fruit rot. Control measures suggested are (1) tar oil spray in winter just before the buds begin to swell, (2) bordeaux spray just before the flowers open, (3) the removal of infected twigs and spurs 2 or 3 weeks after the trees come into blossom, a time when such twigs are conspicuous.

1311. MAIER, W. 632.48: 634.21

Ausmass, Ursache und Verhütung der Monilia-Fäule bei Aprikosen. (Infection, cause and prevention of brown rot in apricots.)

Angew. Bot., 1942, 24: 303-21, bibl. 3.

Apricots suffer very seriously from brown rot. It is found that the foci of the disease are the splits and cracks which are a common feature of the fruits. An even more serious effect than that on the fruit is the summer dieback of twigs which results from it and is due to *Monilia fructigena* and *M. cinerea*. The remedy appears to lie partly with the orchardist who should be able to prevent this splitting by appropriate cultural operations and partly with the breeder who may be able to produce varieties less susceptible to splitting under any conditions.

1312. WORMALD, H. 632.48: 634.1/7 + 633.79

The grey mould of fruit and hops. Weeds as possible sources of infection.

A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 44-7, bibl. 5.

Observations in 1941 showed that grey mould (*Botrytis cinerea*) was prevalent in the first half of June and the beginning of autumn on many cultivated plants and on a number of weeds, particularly on the flower heads of composites. Hence the habit of allowing weeds to grow to plough in as green manure is not recommended. Although normal cover crop plants are not all immune to grey mould they appear to be far less susceptible to infection than such composites as the sow thistles, *Sonchus* spp.

1313. SINGH, U. B. 634.11-2.4

Stem-brown disease of apple in Kumaun.

Indian J. agric. Sci., 1942, 12: 368-79, bibl. 17.

The life history of *Botryosphaeria ribis*, the causal fungus of stem-brown disease of apple, is described. Three strains were isolated all of which could cause infection of apple twigs through both injured and whole surfaces. Progress of infection was slow. In practice the disease can be controlled by the application of a paste composed of a mixture of equal amounts of red lead and copper carbonate in raw linseed oil, or significantly better, in lanoline.

1314. WORMALD, H., AND MONTGOMERY, H. B. S. 634.75-2.4

Strawberry leaf blotch.

A.R. East Malling Res. Stat. for 1941, A25, 1942, p. 44, bibl. 3.

A description is given of a leaf blotch of strawberry, the fungus of which resembles those described previously as *Phyllosticta grandimaculans* (Bubák 1912) which again may be the same as that described earlier (Laibach, 1908) as *Zythia fragariae*. It was first observed in England by Ogilvie in 1931 at Long Ashton.

1315. REID, R. D.

634.75-2.411

Red core disease of the strawberry.

Scot. J. Agric., 1941, 23: 264-72, bibl. 12.

Attempts have been made to control the red core disease of strawberry (*Phytophthora fragariae*) by cultural, chemical and selection and breeding methods. The first two were unsuccessful. As the result of breeding and selection in Scotland 5 varieties have now been released as showing nearly complete immunity in the field under normal conditions. They are A(uchincruive) 1, A.2, A.4, A.5, A.6. It must be noted, however, that these are very susceptible to the yellow edge and crinkle viruses. Work on similar lines in eastern U.S.A. has resulted in the discovery of an immune variety, which has been brought over here and is released in limited quantity under the name American Aberdeen. The qualities of these selections are briefly considered.

1316. WILKINSON, E. H.

634.11-2.4

Dieback and canker of apple branches caused by

a *Gloeosporium* sp.

Gdnrs' Chron., 1942, 111: 269.

After summer pruning many apple trees (Cox's Orange Pippin and Laxton's Superb), growing on ground in Worcestershire that seven years ago had been heavily manured vegetable land, developed severe dieback through infection at the pruning cuts. Trees planted at the same time in grass and not summer pruned were unaffected. The cankers produced are described and illustrated. A fungus, *Gloeosporium* sp., was found to be the cause of the trouble. The same fungus, possibly *G. fructigenum*, is the cause of lenticel rots of apples in storage. Experiments at Long Ashton confirmed that summer pruning may lead to the appearance of the disease and that where manuring has been liberal it may assume epidemic proportions.

1317. CUNNINGHAM, G. H.

634.11-2.4

Research work on ripe-spot of apples.

Orchard. N.Z., 1942, 15: 6: 2.

A brief account of field and laboratory research on ripe-spot of apples (*Neolabrea malicorticis*). The disease first manifests itself on ripe fruits in the form of scattered pink spots, becoming black and sunken. The lesions develop only after the fruit has ripened. Factors increasing infection are (a) late picking, (b) holding the fruit in the shed after removal from the tree, (c) too high temperature in cool store. Under N.Z. conditions the following spray programme will give reasonable control without undue injury:—Bordeaux 1-3-100 in early January, followed by bordeaux 2-6-100 in mid-February and by bordeaux 1-3-100 in third week in March. The fungus is common on the Pacific coast of North America, where it forms large cankers on the branches and laterals. So far such cankers have not been found in New Zealand.

1318. STAPP, C.

632.314

Der Pflanzenkrebs und sein Erreger, *Pseudomonas tumefaciens*. XI. Mitteilung. Zytologische Untersuchungen des bakteriellen Erregers.

(Crown gall and its agent. 11th report. Cytological investigations on *P. tumefaciens*.)

Zbl. Bakt. (Abt. 2), 1942, 105: 1-14, bibl. 18.

HILDEBRAND, E. M., AND HOUGH, L. F.

634.11-2.314

Pollenicides as supplements for bactericides in

blossom blight control.

Proc. Amer. Soc. hort. Sci. for 1942, 1942,

40: 91-4, bibl. 7.

Elgetol and Nitrokleenup powder.

MCKAY, R.

634.11-2.42

Apple scab and its control at Glasnevin in 1939,

1940 and 1941.

J. Dep. Agric. Eire, 1942, 39: 46-79.

- PERLBERGER, J. 634.11-2.4
A heart rot of apple trees caused by *Diplodia* sp.
Palestine J. Bot. (R), 1940, 3: 263-5.
- HILDEBRAND, E. M. 634.722-2.8
Tomato ringspot on currant [red].
Amer. J. Bot., 1942, 29: 362-6, bibl. 11.
1319. MASSEE, A. M. 632.6/7: 634.1/8 + 633.79
Notes on some interesting insects observed in 1941.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 47-51.
- The insects reported are *Agryresthia nitidella*, *Apocheima pedaria*, *Lampronia capitella*, winter moth caterpillars, *Polygonia C-album* (not a pest), *Agromyza frontalis*, *Neurotoma flaviventris*, *Psylliodes attenuata*, *Lytta resicatoria*, *Eucaanthus interruptus*, *Phorodon humuli*, *Aneurus laevis*, *Lygus pabulinus*, *Psyllia mali* and *P. pyricola*, *Phytoptus vitis*, *Apterygida albipennis* (not a pest).
1320. LATHROP, F. H. 634.73-7.23
The blueberry thrips.
J. econ. Ent., 1942, 35: 198-201, bibl. 1.
Soil treatment with kerosene emulsion gave the best control against blueberry thrips [*Frankliniella vaccinii*].
1321. ESSIG, E. O. 634.11-2.753
Woolly aphid apple infesting apple cores.
J. econ. Ent., 1942, 35: 281.
- Woolly aphid has been found inside the core of yellow Newtown apples within a small area in California. The insects obtained access at the blossom end in many fruits in which the opening extended to the core. Often the opening had closed without ill effects to the colony within. A difficult situation arises in regard to apples for canning since there is no means of readily eliminating the insects without cutting the fruit open. If the screens through which the pulp is pressed were made fine enough to exclude insect parts, insufficient pulp would pass to thicken the juice. Coring the fruit before processing would provide a solution but coring does not form part of the normal technique in the canneries affected and machinery is not available.
1322. GRANDORI, R. 634.25-2.78
La lotta contro la tignola orientale del pesco (*Cydiala molesta* Busck). (The control of the oriental peach moth).
Ital. agric., 1942, 79: 343-53.
- Experiments in the north of Italy have shown that very successful control of the oriental peach moth can be obtained by a combination of the following measures:—(1) Removal of infested shoots every 3 or 4 days and their immediate destruction by burial of small amounts or burning of large quantities; (2) destruction of all prunings; (3) collection and destruction of all infested and waste fruit; (4) three or four sprayings with 0.5-0.7% arsenate of lead starting about 25 July; (5) spring disinfection of all packing boxes, receptacles and implements used for the fruit by means of HCN fumigation in a closed building and/or application to the boxes, etc., collected in a closed room, of heat sufficient to induce the emergence of moths from the pupae contained in the boxes. Provided the room is kept closed the insects will die of inanition after emerging, so making the task of all the first four operations much lighter.
1323. HERIOT, A. D. 632.78
Recent progress in codling moth control in British Columbia. I. Killing the mature larva.
Sci. Agric., 1942, 22: 571-6, bibl. 5.
- DENNYS, A. A.
II. Killing the adult.
Sci. Agric., 1942, 22: 577-83, bibl. 7.
- I. It is shown at the Vernon Entomological Laboratory, B.C., in an experiment covering 5½ acres that in heavy infestations and where trees have not been scraped a single dormant application of an oil solution of dinitrocresol to the trunks and main limbs is highly effective in reducing the degree of codling infestation at harvest. Damage, however, was caused to the trees. The use of cheap oils with a low degree of refinement seems to reduce the risk of this injury. Dinitrocresol acts as a stomach as well as a contact insecticide. By placing it well back in the bark crannies in June or early July first generation larvae, which have an importance out of all proportion to their number, escaping the first brood sprays, will receive a second insecticidal attack when chewing the bark preparatory to forming their cocoon. Dinitrocresol applied as a water suspension is toxic to cocooning larvae. If an adjuvant could be found to carry the suspension into the bark crevices the use of oil might be avoided and cost thereby greatly reduced.
- II. Two derivatives of dinitrophenol, namely ammonium dinitrocresylate and sodium dinitrocresylate used as spray at the rate of about 4 oz. per 100 Imperial gal. effected a considerable measure of control on the codling moth in its final imago stage. Substances such as lead arsenate or cryolite, which are toxic to the larva, seem to be relatively non-toxic to the moth and the reverse may be true with other substances at low concentrations. The fact that the reaction of the alimentary tract is alkaline in the larvae and appears to be acid in the moth may have some bearing on the point.
1324. WASHINGTON AGRICULTURAL EXPERIMENT STATION AND OTHERS. 632.78 + 632.654.2 + 632.752
Recommendations for codling moth, orchard mite and scale control in Washington for 1942.
Ext. Bull. Wash. St. Coll. 279, 1942, pp. 12.
- Notes are given on the use of lead arsenate, mineral oils, fish oils, soaps and spreaders, nicotine sulphate and cryolite compounds against codling moth. Dormant oil is recommended against both the Pacific and the European types of mite with summer oil applications as a secondary measure.
1325. POWELL, D. 632.78: 632.42
How do codling moth sprays affect scab control?
Ill. Hort., 1942, 31: 3: 1-3.
- The effect of codling sprays on scab control was investigated by the Illinois Natural History Survey on a twenty-acre block of Delicious apples in 1940-1. The plot receiving 5 lead arsenate-weak bordeaux sprays at intervals from 8 May to 12 June showed 4.5% scab on 16 September, the unsprayed controls 68%. Results with other sprays were not so good. In the following spring the percentages of dead leaves with perithecia under the trees was 2% for lead arsenate-weak bordeaux, 31% for the controls, and of green leaves showing infection in spring 4% and 61% for the control. Results for the other sprays were intermediate as before. The value of the data is discussed. It is concluded that more attention should be given to scab control in late summer, that the codling moth spray schedules are important in scab control and that late control greatly facilitates control the succeeding spring.
1326. WINGO, C. W., AND BROWN, H. E. 632.78
Field studies of codling moth larvae attractants.
J. econ. Ent., 1942, 35: 284-5, bibl. 1.
- Brown sugar added to a number of spray solutions at the rate of 3 to 5 lb. per 100 gal. increased control of codling moth larvae in every case where lead arsenate or Black leaf was used but not when phenothiazine was used.
1327. SIEGLER, E. H., AND JONES, H. A. 632.78
Extracts of apple peels as adjuvants to lead arsenate against codling moth larva.
J. econ. Ent., 1942, 35: 225-6, bibl. 3.
- Lead arsenate combined with alcoholic extracts of apple peels when used with the higher concentrations of non-volatile constituents significantly improved the value of lead arsenate as an insecticide for codling moth larva.

1328. HARMAN, S. W. 632.78
Studies on rotenone and other organic insecticides for codling moth control.
J. econ. Ent., 1942, 35: 223-4.
KIRKPATRICK, A. F. 634.63-2.752
The control of black scale [*Saissetia oleae*] in olive orchards by calcium cyanide dusting.
J. econ. Ent., 1941, 34: 772-7.
KIDO, G. S. 634.75-2.76
Methyl bromide fumigation of strawberry planting stock to control *Paria canella* var. *quadrinotata* (Say).
J. econ. Ent., 1941, 34: 766-8, bibl. 2.
1329. THORNTON, B. J., AND DURRELL, L. W. 632.51
Weeds of Colorado.
Bull. Col. agric. Exp. Stat. 466, 1941, pp. 125.
A valuable bulletin discussing the incidence and control of weeds in general and in particular, with detailed, illustrated descriptions of over 120 species of weed and a note of Colorado's seed, weed and pest laws.
1330. DU TOIT, R. 632.51
The spread of prickly pear in the Union.
Fmg S. Afr., 1942, 17: 300-4.
In certain districts in South Africa, especially outside the so-called biological areas, prickly pear is spreading. Instructions are given how best to deal with it by chemical, mechanical or biological means and, if employing the latter, how to avoid the destruction of the spineless cactus.
1331. TIMMONS, F. L. 632.51
The dissemination of prickly pear seed by jack rabbits.
J. Amer. Soc. Agron., 1942, 34: 513-20, bibl. 8.
Jack rabbits are important agents in the dissemination of prickly pear, *Opuntia* spp., in Kansas. Droppings collected in the observed pastures contained 2.5 seeds per pellet, those in nearby uninfested fields had only occasional seeds. Germination of seeds from the rabbit droppings was 50% greater than of seeds from the dried fruits.
1332. MINSHALL, W. H. 632.51: 631.415
Hydrogen-ion concentration and weed control.
Sci. Agric., 1942, 22: 647-58, bibl. 32.
The toxic point of acidity for dandelion, white clover, Kentucky blue grass (*Poa pratensis*) and brown top grass (*Agrostis tenuis*) in sand and solution cultures was between pH3 and pH4. The grasses were slightly more tolerant and able to establish themselves in a medium of greater acidity than the dandelion. It is doubtful whether the difference in tolerance between weeds and grasses is great enough for acidity *per se* to act as a controlling factor, since the critical point for all plants is more acid than most soils, but acidifying the soil might be useful as a temporary measure while a grass sward was being established.
1333. FENTON, E. W. 632.51: 631.83/84
Bracken for potash and nitrogen.
Farming News, 1942, April 24, pp. 2.
And possibly as animal food.
GREENHAM, C. G., AND WILKINSON, T. 632.954
Studies on chemical weed-killers with special reference to skeleton weed. 4. Further spray trials and toxicity investigations with a note on translocation.
J. Coun. sci. industr. Res. Aust., 1942, 15: 154-61, bibl. 7.
1334. MOORE, M. H., AND STEER, W. 632.95
The East Malling spray calendar, 1942 edition.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 68.
Eight years ago East Malling produced its first spray calendar. So rapid have been the changes and discoveries with regard to sprays that scarcely one of the original recommendations remains unchanged. Chief among the new developments are the D.N.C. (dinitro cresol) winter washes as an alternative to tar and petroleum washes and the nicotine vapour method of controlling aphids on strawberry plants.
1335. CARTER, G. 638.12: 632.95
Fruit sprays and bees. Where lead arsenate should not be used.
Fruitgrower, 1942, 94: 54.
Lead arsenate should be used for fruit sprays only before the flower buds open and after they have fallen. Open blossom should never be sprayed.
1336. CUPERY, M. E., AND GORDON, W. E. 632.954
Sulfamic acid. An industrial review.
Industr. Engng Chem. (Industrial Edition), 1942, 34: 792-7, bibl. 53.
The discovery of a practical process for the manufacture of sulphamic acid has stimulated the development of various industrial uses for this acid and its derivatives. These are discussed. As a herbicide ammonium sulphamate is more effective than ammonium sulphate, ammonium thiocyanate, sodium chloride and calcium chloride and equally as effective as sodium chlorate. It will readily eradicate such woody plants as poison ivy when used at a concentration of 1 lb. per gallon of water. Annual weeds are easily killed by a simple spraying. Certain resistant perennials such as bindweed, blackberry or grasses may require additional treatment. For greatest effect the mature plant should be in full leaf. The action of the chemical is rendered more effective under conditions of high humidity and is probably associated with the translocation of the salt into the plant structure chiefly through the leaf tissues.
1337. CHRISTOPHER, E. P. 634.11-2.952
A comparison of lime sulphur and flotation sulphur spray on apple trees.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 63-7, bibl. 5.
From the standpoint of leaf injury, growth and yield of apple trees, flotation sulphur is much preferable to lime-sulphur.
1338. ROBERTS, J. W. 632.952
Substitutes for copper and zinc in fungicidal sprays.
Industr. Engng Chem. (Industrial Edition), 1942, 34: 497-8.
Of several hundred organic materials tested as possible substitutes for copper and zinc, phenothiazine is one of the most promising, especially in the control of apple scab and possibly against bitter rot. It has caused no injury to fruit or leaf, nor in the East and Middle West of U.S.A., where the investigations were conducted, has it delayed maturity. Its principal weakness is lack of adherence. This can be overcome in great part by finer grinding. The price is at present prohibitive. The dinitro compounds are injurious to growing plants. The thiuram disulphides show some promise. The diphenylamine derivatives, though promising, scarcely equal the fungicides in use. The thiocarbamates may possibly become useful. Ferric dimethyl dithiocarbamate spreads and sticks well, unlike all the other organic chemicals tested. It appears to have controlled apple scab without injury to fruit or foliage.
1339. ROY, D. N., AND GHOSH, S. M. 632.951: 581.192
A new active constituent of pyrethrum flower.
Nature, 1942, 150: 153, bibl. 2.
Kerosene extract prepared from the sun-dried residue left after the removal of pyrethrins I and II from a sample of pyrethrum flowers was found to be still active. The tentative conclusion is drawn that in addition to the pyrethrins there were other substances possessing insecticidal properties. The nature of the substance(s) is not yet known.

1340. SMITH, C. M., AND GOODHUE, L. D. 632.951
Particle size in relation to insecticide efficiency.
Industr. Engng Chem. (Industrial Edition), 1942,
34: 490-3, bibl. 17.
Toxicity tests with solid insecticides separated into fractions
of different particle size have shown those with smaller
particles to be the more effective. Greater subdivision
would doubtless increase the efficiency of a number of
insecticides now available only in coarse form. With oil
emulsions droplet size is important. With oil sprays the
quantity of the oil appears to be more important than
droplet size. Solids and liquids can both be applied in
aerosol form and the degree of fineness and stability of such
aerosols can be improved by means of protective smokes
and surface-active agents to the point where many new
fumigants may be developed. [From authors' summary.]
1341. AMBROSE, A. M., DEEDS, F., AND MCNAUGHT,
J. B. 632.951
Chronic toxicity of derris.
Industr. Engng Chem. (Industrial Edition), 1942,
34: 684-9, bibl. 11.
The determination of health hazards to workers engaged in
the grinding of derris root, in employing derris sprays and to
the public consuming derris-contaminated fruits and
vegetables is the ultimate aim of the investigations reported.
1342. ROARK, R. C. 632.951
The examination of plants for insecticidal con-
stituents.
J. econ. Ent., 1942, 35: 273-5, bibl. 10.
The author believes that many plants contain hitherto
unsuspected insecticidal organic compounds. A systematic
search is necessary and not only among plants already
reputed to have insecticidal properties. Suggestions are
made as to how the tests should be carried out.
1343. LITTLE, V. A. 632.951
Rotenone content, an inherited character in the
roots of devil's shoestring (*Tephrosia virginiana*).
J. econ. Ent., 1942, 35: 54-7, bibl. 4.
By following approved methods of plant breeding it is
probable that highly toxic strains of *Tephrosia virginiana*,
a native of U.S.A. (Texas), could be obtained.
1344. GINSBURG, J. M., SCHMITT, J. B., AND REID,
T. S. 632.951
A rotenone-bearing variety of *Tephrosia virginiana*.
J. econ. Ent., 1942, 35: 276-80, bibl. 19.
The roots of *Tephrosia virginiana*, indigenous to New Jersey,
were practically devoid of rotenone and low in total extrac-
tives and of little toxicity to insects. The same species
grown in New Jersey from plants obtained from Texas
reproduced their characteristic high rotenone content.
Acetone extracts of the roots proved highly toxic to aphids.
Seedlings of these New Jersey grown Texas plants are being
raised with a view to discovering whether the high rotenone
content will persist in the second generation under New
Jersey conditions.
1345. PEARCE, G. W., CHAPMAN, P. J., AND AVENS,
A. W. 632.78
The efficiency of dormant type oils in relation to
their composition.
J. econ. Ent., 1942, 35: 211-20, bibl. 17.
A study of the insecticidal efficiency of 39 petroleum oils
of the dormant type using the fruit tree leaf roller *Cacoecia*
argyrospila as the principal test insect. Full data are given
on each oil and the theoretical and practical implications
of the results are discussed. [From authors' summary.]
1346. WORTHLEY, H. N., AND FREAR, D. E. H. 632.951: 634.11
Deposition of lead from lead arsenate spray mix-
tures and its retention on pyralin plates and apple
leaves and fruits.
J. econ. Ent., 1942, 35: 205-10, bibl. 10.
Certain interesting relationships in the deposition and
retention of lead from various spray mixtures were revealed.
1347. ASSOCIATION OF APPLIED BIOLOGISTS. 632.951+632.952
Discussion on the interpretation of toxicity data.
Ann. appl. Biol., 1942, 29: 326-32.
(i) MARTIN, H. 632.952
The significance of the bio-assay in studies of
fungicidal action, pp. 326-8, bibl. 16.
(ii) PARKER-RHODES, A. F. 632.952
An improved method for the statistical analy-
sis of fungicidal data [abstract], p. 329.
(iii) POTTER, C. 632.951
The "film technique" of insecticide testing,
pp. 329-30, bibl. 1.
(iv) FINNEY, D. J. 632.951
Examples of the planning and interpretation
of toxicity tests involving more than one
factor, pp. 330-2, bibl. 5.
WAIN, R. L. 632.951
The use of toxic polynitro derivatives in pest
control. I. The estimation of dinitro-*o*-cresol
and dinitro-*o*-cyclohexylphenol.
Ann. appl. Biol., 1942, 29: 301-8, bibl. 28.
SMITH, L. M. 634.1/2-2.951
Toxicants used with petroleum oil sprays for
deciduous fruits.
J. econ. Ent., 1941, 34: 844-53, bibl. 74.
HOSKINS, W. M. 632.951
Some recent advances in the chemistry and physics
of spray oils and emulsions.
J. econ. Ent., 1942, 34: 791-8, bibl. 27.
HARDY, C. H. 632.951.8
Experiments with winter washes containing
dinitro-*o*-cresol.
Agriculture, 1940, 47: 129-34, bibl. 3.
KILGORE, L. B., FORD, J. H., AND WOLFE, W. C. 632.951
Insecticidal properties of 1,3-indandiones. Effect
of acyl groups.
Industr. Engng Chem. (Industrial Edition), 1942,
34: 494-7, bibl. 12.
TISDALE, W. H., AND FLENNER, A. L. 632.951
Derivatives of dithiocarbamic acid as pesticides.
Industr. Engng Chem. (Industrial Edition), 1942,
34: 501-2, bibl. 5.
SMITH, L. E. 632.951
Synthetic organic compounds as potential insecti-
cides.
Industr. Engng Chem. (Industrial Edition), 1942,
34: 499-501, bibl. 27.
LINCOLN, C. G., SCHWARDT, H. H., AND PALM,
C. E. 631.4: 632.944
Methyl bromide-dichlorethyl ether emulsion as
a soil fumigant.
J. econ. Ent., 1942, 35: 238-9, bibl. 1.
YOUNG, P. A. 634.1/7-2.951
Physiological and physical effects of spray oils on
deciduous trees.
J. econ. Ent., 1941, 34: 838-44, bibl. 58.
MAINE AGRICULTURAL EXPERIMENT STATION.
631.531+632.952+632.951
Official inspections 182. Commercial agricul-
tural seeds, 1941, Fungicides and insecticides,
1941, 1941, pp. 110-52.

VEGETABLES, OIL SEEDS, STIMULANTS, ETC.

1348. VAN ELDEN, H. 635.1/7: 631.531
The production of vegetable seed.
Fmg S. Afr., 1942, 17: 425-30.

Notes are given on the treatment required for seed production in South Africa by each of the different classes of vegetable, and the desirable characteristics which should influence selection of the seed parents are pointed out. The extraction, threshing and cleaning of seed are briefly discussed.

1349. HILL, A. G. G. 635.1/7: 631.531
Vegetable seed growing in East Africa.
E. Afr. agric. J., 1942, 8: 15-20, bibl. 16.

General information on seed growing in temperate countries has been compiled from the literature available and applied to East African conditions. It is not certain whether all kinds of vegetables will seed in East Africa, e.g. brassicas, because of insufficiently low temperatures to stimulate flowering, and onions, except the Bombay type, because of inadequate day length. In view of the present activity in local seed growing engendered by war conditions this article should prove useful elsewhere than in East Africa.

1350. CLAYTON, J. 635.1/7: 631.531
Growing farm crops for seed.
Agriculture, 1942, 49: 112-6.

In the present emergency seed of farm crops will have to be grown by many who have hitherto given the matter little attention. Instruction is given here on the growing for seed of turnips, swedes, sugar beet, kale and rape. The article will well repay study.

1351. NATIONAL INSTITUTE OF AGRICULTURAL BOTANY,
CAMBRIDGE. 635.1/7: 631.531
Cross-fertilization in brassicas.
Agriculture, 1942, 49: 116-7.

In growing brassicas for seed it is necessary to prevent cross-fertilization. At least 1 mile should separate any brassicas likely to intercross. In this paper the various species and their horticultural derivatives are so grouped as to show at a glance what varieties can safely be planted in proximity.

1352. ANON. 635.13: 631.531
Growing carrots for seeds at Kew.
Gdnrs' Chron., 1942, 112: 97.

Early Market carrot, a second early stump-ended, half-long variety, proved the best of many grown at Kew in 1941. The best roots were selected to be grown on for seed the following year. Winter storage was in old coal ash and in coarse river sand. Though those stored in sand were the better colour when taken out in spring for replanting, there was no apparent difference in keeping quality.

1353. REED, H. S. 581.141: 546.47
The relation of zinc to seed production.
J. agric. Res., 1942, 64: 635-44, bibl. 15.

Highly purified nutrient salts were used in trials with peas, beans, and milo in California. It was found that in the absence of zinc growth only proceeded to a certain point, which did not include seed development. There was a threshold value of zinc for peas and beans below which they produced only small seedless pods. Above this, but still with the sub-optimal supplies of zinc, viable seed was produced.

1354. QUARRELL, C. P. 631.544: 635.1/7
Winter crops from glasshouses. Fitting in with the cropping order.
Fruitgrower, 1942, 94: 163-6.

Suggestions are made for using glasshouses to the best advantage for vegetable crop production in accordance

with the latest Horticultural Cropping Order. A feature of the article is a detailed account of the methods employed in large-scale production of mustard and cress. The technique is by no means as simple as might be supposed and little has previously been published concerning it.

1355. TAYLOR, H. V. 631.544
Glasshouse cropping and the fuel supply.
Agriculture, 1942, 49: 110-2.

The dependence of glasshouse horticulture on artificial heating is discussed and includes a brief account of the types of fuel used and of the methods employed to obtain efficiency with economy. The effect of the new Horticultural Cropping Order on glasshouse cropping is explained.

1356. WILSON, J. 631.544
Food from the small greenhouse.
J. roy. hort. Soc., 1942, 67: 338-42.

The management of a small greenhouse for the growing of early vegetable crops. The use of moderate heating (40°-45° F.) is assumed.

1357. BEWLEY, W. F. 631.544: 635.1/7
Food production in glasshouses. Meeting the new cropping programme.
Fruitgrower, 1942, 94: 161-2.

The following advice is given:—*Tomatoes*. In heated houses plant the main tomato crop about the end of February and follow it with a crop of pot or box grown tomatoes which have stood outside during the summer. Seeds for the second crop should be sown about the middle of May and plants should be potted into the final containers before 7 July. The containers are taken indoors following the removal of the main crop and before the September frosts. If the house temperature is maintained at 50° F., picking may continue up to mid-January. Firm, fleshy varieties such as Potentate or Vetomold should be used for these late crops. *Winter lettuce*. Use Cheshunt Early Giant in heated houses and Cheshunt Early Ball in cold houses. In cold houses lettuce will follow the tomato main crop. *Cabbage*. Spring cabbage of the Early Offenham type is a useful winter cold house crop costing little to raise.

1358. MASSEE, A. M. 632.951: 631.544
A means of preventing outbreaks of certain pests in experimental greenhouses.
A.R. East Malling Res. Stat. for 1941, A25, 1942, p. 51.

A simple method of preventing infestation of experimental greenhouses by red spider and similar pests is described. One and a half lb. of ground derris powder and 2 lb. of soft soap are added to each hundred gallons of water in the tank in the house, used for "damping down" the plants each morning, midday and evening. An Eclipse hand-machine is used to facilitate damping down the plants, and the water in the tank is well stirred before the syringing begins. When the tank is about half empty a fresh supply of derris and soap is added, and the tank filled with water. The amount of derris and soap added for this and subsequent mixings is reduced to one-eighth of the original quantity, namely to derris 3 oz. and soap 4 oz. Provided the plants are thoroughly damped down each morning, midday and evening, and the water in the tank is well mixed before the syringing is done, the reduced amount of derris is sufficient to prevent red spider and aphides establishing themselves on the plants. This is doubtless due to the accumulation of derris on the foliage, resulting from the treatment. Such treatment should prove invaluable in the virus house where grafting experiments are in progress.

1359. WALLACE, T. 635.1/7: 631.8
Problems of wartime vegetable manuring.
General maintenance and individual needs.
Fruitgrower, 1942, 94: 162-3.
Advice is given on the best method of using such manures as are likely to be available for vegetable gardening. Suggestions are made for dealing with the problems which will arise as supplies of certain elements become shorter. A summary of the commonly grown market crops indicates the priority which should be given them in regard to various manures where supplies are limited.
1360. WALKER, W. F. 635.1/7: 631.86/87
The use of organic manures for horticultural crops.
Tasm. J. Agric., 1942, 13: 65-70, bibl. 2.
The manures for the purposes of this article are grouped into two classes:—A. Chiefly animal and vegetable wastes. B. Bulk manures chiefly of farmyard origin, shoddy and seaweed. Twenty-six of these are individually dealt with in brief notes and there are some remarks on the care and preservation of farm manures.
1361. STEWART, A. B., AND WILLIAMS, E. G. 631.855
Time of application of fertilizers with special reference to superphosphate.
Scot. J. Agric., 1942, 24: 52-6.
Lime may be applied at any time, except just before a potato crop; nitrogen, in straight fertilizers or compounds, when crops are growing or starting to grow; potash at any time, except that on light sandy soils in wet districts autumn and winter application might be wasteful. Comparison between spring and autumn applications of superphosphate show that superphosphate can be applied in autumn without impairing its efficiency. Application at any time that this fertilizer is available would prove to be more economical than storing it till the spring. Fertilizers delivered out of season can be kept a long time in good condition if peat litter is included in the mixture as a conditioning agent.
1362. KEESE, H. 632.19: 546.27 + 546.711
Ein Beitrag zur Frage der Wirkung von Bor und Mangan auf das Pflanzenwachstum unter besonderer Berücksichtigung des Einflusses der Kalkdüngung. (The effect of boron and manganese on plant growth with particular reference to the influence of liming.)
Bodenk. Pflernähr., 1942, 27: 116-34; bibl. 14.
From results at the Limburgerhof Research Station with various crops the author concludes that the use of excessive lime may result in the appearance of boron and manganese deficiencies. Where these deficiencies are determined boron and manganese must be applied to make them good, as also to ensure the full effect of the major nutrients N, P and K. Trials indicate that spinach and turnips are among the first crops to need boron application and potatoes to a smaller degree. Manganese is in particular demand by oats, followed by spinach, while potatoes hardly need it and turnips are even harmed by its presence.
1363. BEAR, E. M. 631.515: 635.1/7
The dust mulch theory.
Gdnrs' Chron., 1942, 112: 52.
ANON.
The dust mulch.
Gdnrs' Chron., 1942, 112: 73.
I. The maintenance of a dust mulch during 5 weeks of almost rainless summer weather did not assist cos lettuce so treated to resist drought to a greater degree than those growing on ground which was practically untouched and had become hard and caked.
II. Two-year-old asparagus plants suffering from drought were not helped by frequent hoeings. After finely sifted dry soil containing some wood ash had been placed in the hollows round the plants close up to the collar, new growth started within 24 hours. The potash in the wood ash could not have had time to take effect and there had been no rain to wash it into the ground. It is known that plants such as lettuce or those with broad leaves close to the ground keep the underlying soil moist and the author suggests this may be in part brought about by transpiration. He considers that his results with asparagus confirm the belief among gardeners that the collars of many plants are readily injured by strong light and dry air and that for such plants a dust mulch or a mulch of stones would be of benefit.
1364. STORCK, A. 632.111
Glasfasermatten als Frostschutz. (Glass fibre mats for frost protection.)
Gartenbauwirtschaft, 1941, 58: 16: 5-6, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 90.
Three years experiments have proved the usefulness of glass wool and glass fibre mats as substitutes for the more common straw mats used for frost protection. Their excessive cost at present, however, prohibits their use.
1365. GÖPPERT, B. 635.1/7: 632.111
Zehnjährige Erfahrung mit Frostschutzhäuben. (Ten years trials of paper shields to prevent frost damage.)
Blumen- u. Pflb., 1941, 45: 78, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 57.
In field trials over a period of ten years it was found possible to harvest all sorts of cabbage species, cucumbers and beans from 10 to 24 days earlier as the result of protecting them from the cold with paper caps provided with a hole in the middle. Only in one year did failure occur owing to the fact that frost persisted so long that the ground could not be properly worked and planting out had to be delayed.
1366. GOUGH, H. C., AND EVANS, A. C. 632.765
Some notes on the biology of the click beetles *Agrotis obscurus* L. and *A. sputator* L.
Ann. appl. Biol., 1942, 29: 275-9, bibl. 12.
GOUGH, H. C. 632.765
Laboratory and field experiments on the control of wireworms.
Ann. appl. Biol., 1942, 29: 280-9, bibl. 10.
In a large-scale field experiment neither naphthalene at 15 cwt./acre or calcium sulphide at 350 lb./acre, broadcast in February and ploughed in, caused any decrease in wireworms.
1367. DURHAM, H. E. 632.9
Some deterrent trials.
Gdnrs' Chron., 1942, 112: 76-7.
A 40% asafetida cream was made by shaking the gum resin in plain water without preparatory pulverizing. Peas treated before sowing with this emulsion were immune from mouse attack. Similarly radishes were saved from underground attack by beetle. Dried leaves and blossoms of wormwood (*Artemisia absinthium*), in this case home-grown, were pressed in paraffin oil, the oil being poured to double the height occupied by the plant material when pressed. Seedlings of swedes, turnip and radish treated with the solution so formed were not attacked by turnip, radish or flea beetle and treated peas were not attacked by mice. The asafetida is very sticky and wormwood is therefore to be preferred. It can be easily grown in the garden in a sunny position.
1368. REGEL, C. 633/635
Beiträge zur Kenntnis von mitteleuropäischen Nutzpflanzen. III. (Economic plants of Central Europe. III.)
Angew. Bot., 1942, 24: 278-302, bibl. 43.
Brief notes are given of the growth or possible growth of the following:—*Diospyros* species; cape gooseberry (*Physalis peruviana*) in Lithuania; teasel (*Dipsacus sativus*) in

Lithuania; the economic value of green algae (especially *Cladonia*); the possible use of *Calamagrostis* spp. as fodder plants; sedges as fodder plants; fodder plants of the Arctic; cosp. polygonum (*Polygonum dumetorum*) as a medicinal plant; certain essential oil plants of the *Umbelliferae*.

1369. LYSENKO, T. D. 633.491
Soviet scientific work on potatoes.
Nature, 1942, 150: 456-7.

The substance of a cable from Professor Lysenko to Sir John Russell describing the recent results of Russian research work on the potato crop. Greatly increased areas having to be planted, the shortage of seed was overcome by the use of potato tops, and methods for their preparation and planting were elaborated. Yields were no less than when grown from seed, and there was less susceptibility to ring rot. It is stated that details of method have been asked for. By sowing in July in South Russia to avoid the high June temperature potatoes can be raised to use as seed the following April. This seed gives very good results in subsequent yield. In the heat of the south, however, seed for this July planting cannot be kept over from the previous year, nor will freshly gathered seed (e.g. from the April planting) normally sprout without a rest period. The length of the rest period depends largely on the access of air to the nutrients in the tuber. The removal of the skin allows immediate access and sprouting rapidly occurs. A simple device for large-scale removal of skin has been worked out. The application of these methods has greatly extended the potato area of the south.

1370. SNELL, K. 633.491-1.52
Die Lichtkeime der im Jahre 1942 zugelassenen Kartoffelsorten. (Sprout characters of certified potato varieties in Germany in 1942.)
Angew. Bot., 1942, 24: 249-58.

The truthness of name of potato varieties can be established by observations on the shape and colour of tuber and on the character of the sprouts formed. Details are given for 70 varieties.

1371. WOLLENWEBER, H. W. 633.491-1.531-
Über die Lebensdauer von Kartoffelsamen.
(The life of potato seeds.)
Angew. Bot., 1942, 24: 259-60.

Seed of *Deodara* potatoes kept without loss of germinative power for 13 years in glass-stoppered bottles at room temperature. Germination capacity dropped in the next 7 years to 9%.

1372. BUSHNELL, J. 633.491-1.532.2
The age of maximum reproduction vigor in Irish Cobbler seed potatoes.
Amer. Potato J., 19: 124-9, bibl. 6.

Irish Cobbler tubers in Ohio are at an optimum age for planting 10 to 11 months after planting the previous season.

1373. MORGAN, E. T. 633.491-1.532.2
Some light on the sprouting of seed potatoes.
J. Dep. Agric. W. Aust., 1941, 18: 247-8, reprinted in *Rhod. agric. J.*, 1942, 39: 177-8.

Recent work at the Boyce Thompson Institute by N. C. Thornton* has shown that the failure of potato tubers to sprout at once after harvest is due to a too high oxygen content, e.g. 20% (not too low, as hitherto thought), and that until the content is diminished to below 10% by decreasing impermeability of the peel there will be no shoot growth. Hence both cutting and peeling induce sprouting because the formation of dense wound cork tissue reduces oxygen permeability to the necessary degree. After this summarizing of Thornton's results the author mentions that storage of tubers under moist conditions also causes thickening of

the periderm and earlier sprouting, whereas dry conditions have a retarding effect. Thus growers might to some extent regulate the sprouting of their tubers by attention to storage conditions. Growers claim that spraying tubers with nitrate of soda or sulphate of ammonia solutions will hasten sprouting. Whatever the effect of the chemical it is evident that the spray would create moist conditions enabling the skin to thicken sufficiently to start sprouting. [A footnote to the reprint states that in Rhodesia the tubers are treated with carbon bisulphide in airtight containers to obtain uniform sprouting, but that the matter has not been fully investigated.]

1374. TER-SAAKIAN, T. S. 633.491-1.532.2
New methods for breaking dormancy in recently harvested potato tubers.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 165-7, bibl. 14.

The author's trials indicate that in regions marked by long intervals between frosts two yields of potatoes can be obtained in one year, provided the potatoes from the first crop are sprouted before replanting. The method of sprouting is as follows:—A pit 1 m. wide by 15-20 cm. deep is dug on an open, flat spot. The trench is watered but not beyond the water-holding capacity of the soil. The young tubers selected, which must be ripe and of good size weighing from 40 to 60 g., are poured into the pit so as to fill it. The pit is then covered, first with a layer of straw 3 cm. thick and then with a 10-12 cm. layer of earth. This is rammed and watered, though the water must not reach the potatoes. Instead of watering, a thin layer 1-2 cm. of very moist soil can be added. Under Armenian conditions the temperature in July of such a pit will be 25-30° C. Under such conditions 80-90% of the late or medium late variety tubers but only 1-2% of the early variety tubers will show sprouts on the 12th-15th day. Planting out must be done in a soil which is not too dry or very poor growth will result. In reasonably moist soil the sprouted and planted tubers will quickly send up a vigorous stem with a large leaf area.

1375. SMITH, O. 633.491-1.8
Fertilizer and nutrition studies with the potato in 1941.
Amer. Potato J., 1942, 19: 108-18, bibl. 57.

A brief summary of the results of investigations published in 1941 on fertilization, rotations, green manures, cover crops and soil reaction with reference to the potato.

1376. WHITE-STEVENS, R. H. 633.491-1.85
Effect of different sources of phosphorus on the production of potatoes on Long Island.
Amer. Potato J., 1942, 19: 81-90, bibl. 4.

Superphosphate, nitrophoska, soft phosphate, potassium metaphosphate and monocalcium chlorophosphate were equally efficient in providing adequate phosphoric acid in the production of potatoes on Long Island. Ammophos did not appear to be so suitable on low reaction potato soils.

1377. SMITH, O., AND NASH, L. B. 633.491
Potato quality. V. Relation of time of planting, time of harvest and fertilizer treatment to cooking quality.
J. Amer. Soc. Agron., 1942, 34: 437-51, bibl. 9.

A relationship is shown to exist between temperature and light conditions during the latter part of the growing season and the specific gravity, dry weight, colour and texture of boiled potato tubers grown under those conditions. Wide variations in fertilizer treatment appear to have little effect on the above qualities. Such effects as did appear were probably due to hastening or retarding maturity and therefore subjecting them to different environmental factors during later growth.

* *Contr. Boyce Thompson Inst.*, 1939, 10: 339-61; *H.A.*, 9: 1271.

1378. DREW, J. P., AND DEASY, D. 633.491-1.8: 581.192
The influence of manures on the percentage of starch of potatoes and on the total yield of starch. *J. Dep. Agric. Éire*, 1942, 39: 35-45, bibl. 3.
The addition of N, P and K to the recommended 1-4-1 standard of potato manure did not materially influence yield of tubers, percentage and yield of starch or monetary value. Some increased yield was obtained by the addition of K or NK in the abnormal climatic conditions of 1939 and the substitution of sulphate of potash for muriate of potash significantly increased the percentage of starch in the tubers. When, however, the produce is sold on a flat rate rather than a starch content basis the difference from the economic standpoint is in favour of muriate of potash.
1379. M'INTOSH, T. P. 633.491
Cooking quality of potatoes. *Scot. J. Agric.*, 1942, 24: 38-47, bibl. 8.
Apart from the cooking process the major factors influencing cooking quality of potatoes in order of importance are: variety, climate, soil, manuring. Other considerations are storage, sprouting and spraying. Over-emphasis on yield has led to a deterioration in quality in present-day types compared with that of the older varieties. Excellent quality seldom accompanies outstanding yields, though some moderately heavy croppers such as Gladstone and Dunbar Standard undoubtedly have good quality, while Golden Wonder is an example of high starch content combined with excellent cooking quality. On the whole, however, it can be said that in breeding the desirable combination of good food value and good quality seems to have been little considered. The suggestion is made that breeders working for yield have ignored quality and *vice versa*. Steps that should be taken to improve quality are discussed; apart from the breeding of improved varieties much could be done by the organization of marketing on lines put forward by the author. Some notes are given on the effects of environmental factors though the available information is by no means precise.
1380. BALD, J. G., AND PUGSLEY, A. T. 633.491-2.8
The main virus diseases of the potato in Victoria. *Pamphl. Coun. sci. industr. Res. Aust.* 110, 1941, pp. 40, bibl. 23.
Experiments reported here on Victorian potatoes cover a period of 5 years. In particular descriptions are given of the most destructive virus diseases of the Carman, Up-to-date and Snowflake varieties. These are mainly due to 4 types of virus, namely X, A, Y and leaf roll viruses. The effects of the viruses on other varieties are also considered and the phenomena associated with the incidence of other viruses on different varieties are described.
1381. CALDWELL, J. 633.491-2.8
The production of virus-free potatoes in the south-west of England. *Ann. appl. Biol.*, 1942, 29: 265-7.
Trials at a number of points show that large quantities of virus-free seed potatoes could readily be produced on Dartmoor, Bodmin Moor and parts of Exmoor as well as in many other districts of west Devon and Cornwall. Generally speaking the most favourable areas, i.e. windswept and of high humidity, are those least suited to other agricultural activities. Elementary precautions necessary are:—(1) that different varieties must be grown in isolation, (2) that the practice of allowing farm workers to grow a few rows of their own seed in the middle of a crop must be stopped.
1382. SCOTT, R. J. 633.491-2.8
The effects of mosaic diseases on potatoes. *Scot. J. Agric.*, 1941, 23: 258-64, bibl. 6.
The effects of the following mosaic diseases of potato are discussed:—Virus A, Virus X, Virus Y and combinations thereof, leaf roll virus.
1383. STAPP, C. 633.491-2.8
Serologischer Nachweis von X-, Y- und A-Virus der Kartoffeln. (Serological identification of X-, Y- and A-viruses in the potato.) *Zbl. Bakt.* (Abt. 2), 1942, 105: 128-30, bibl. 7.
Notes on the fact that at last there are 3 antisera available for the detection of the 3 types of virus attacking the potato. The 3 viruses can now, by their aid, be differentiated from one another even when present mixed in the plant. The method allows both of their qualitative and quantitative estimation.
1384. SÖDING, H. 633.491-2.8: 577.15.04
Über den Wuchsstoffhaushalt abbaukranker Kartoffeln. (The growth substance content of diseased potatoes.) *Angew. Bot.*, 1942, 24: 114-7, bibl. 8.
Experiments show that the growth substance content in the different parts of the potato plant, including the tuber, infected with virus diseases is much lower than in healthy plants.
1385. BONDE, R. 633.491-2.314
Ring rot in volunteer plants. *Amer. Potato J.*, 1942, 19: 131-3.
Bacterial ring rot of potatoes in Maine, U.S.A., was proved to be perpetuated in the field by infected tubers which had been left in the ground and survived the winter. It does not follow that the ring rot organism may not also survive in the soil under some conditions.
1386. ALBRECHT, W. A., AND SCHROEDER, R. A. 633.491-1.415
Plant nutrition and hydrogen ion: I. Plant nutrients used most effectively in the presence of a significant concentration of hydrogen ions. *Soil Sci.*, 1942, 53: 313-27, bibl. 9.
SCHROEDER, R. A., AND ALBRECHT, W. A. 633.491-2.3
II. Potato scab. *Soil Sci.*, 1942, 53: 481-8, bibl. 5.
The possible role of the hydrogen-ion in bringing about a greater availability of the exchangeable nutrients in the soil is suggested. Of the possible cations taken by plants calcium, magnesium, strontium and manganese were moved into spinach in greater amounts and concentrations in the presence of the significant hydrogen concentration than in soil that was nearly neutral. With the monobasic cation, potassium, and the anion, phosphorus, increased hydrogen-ion concentration of the medium did not have any such effect, yet both the totals and concentrations suggested a precipitation—peptization behaviour according to the amounts of exchangeable calcium in the soil.
II. The results in terms of yield of potato tubers, potato tops and incidence of potato scab, where the levels of exchangeable calcium and potassium were varied in relation to each other while other nutrients were held constant—all at different degrees of soil acidity—point to the importance of the relation of calcium to potassium in the production of this crop. Soil acidity as a means of reducing the incidence of potato scab is apparently effective because of the increased mobilization of certain cationic plant nutrients by the presence of the hydrogen-ion.
1387. MÜLLER, K. O., AND GRIESINGER, R. 633.491-2.411
Der Einfluss der Temperatur auf die Reaktion von anfälligen und resistenten Kartoffelsorten gegenüber *Phytophthora infestans* (The effect of temperature on the reaction of potato varieties susceptible and resistant to blight.) *Angew. Bot.*, 1942, 24: 130-49, bibl. 5.
The optimum temperature for the development of the fungus is found to be 19°-20° C. (66°-68° F.).

1388. DANIELS, L. B. 633.491-2.7
Colorado potato pests.
Bull. Col. agric. Exp. Stat. 465, 1941, pp. 28, bibl. 10.
The following pests are dealt with in detail:—the psyllid *Paratrioza cockerelli*, flea beetle (*Eptirix* spp., *Systena taeniata*), Colorado beetle (*Leptinotarsa decemlineata*).
1389. EXT, W., AND GOFFART, H. 633.491-2.654.1
10 Jahre Kampf gegen den Kartoffelnematoden in der Provinz Schleswig-Holstein. (Ten years' work on potato nematode control in Schleswig Holstein.)
Angew. Bot., 1942, 24: 1-16, bibl. 16.
The institution of a three-year rotation on clean land and abstention from potato growing for six years on land known to be infected have had an excellent effect on potato production in market and small gardens in Schleswig Holstein. A certain amount of undoubted success against nematode has attended the use of "Cystogon", a new preparation made by the I. G. Farbenindustrie A. G. Werk Wolfen. It is used in the form of a dry powder applied to the ground and raked in before planting.
1390. WERNER, H. O. 633.491: 581.141: 612.014.44
Relation of length of photoperiod and intensity of supplemental light to the production of flowers and berries in the greenhouse by several varieties of potatoes.
J. agric. Res., 1942, 64: 257-74, bibl. 10.
CLARKE, A. E., AND LOMBARD, P. M. 633.491: 581.145
Flower bud formation in the potato plant as influenced by variety, size of seed piece, and light.
Amer. Potato J., 1942, 19: 97-105, bibl. 6.
BELKENGREN, R. O., AND CIESLAK, E. S. 633.491-1.56
Effect of heat-drying upon the periderm of washed potatoes.
Bot. Gaz., 1942, 103: 622-4, bibl. 2.
LEVITT, J. 633.491-2.19
A histological study of hollow heart of potatoes.
Amer. Potato J., 1942, 19: 134-43, bibl. 5.
KRANTZ, F. A., AND LANA, E. P. 633.491-2.19
Incidence of hollow heart in potatoes as influenced by removal of foliage and shading.
Amer. Potato J., 1942, 19: 144-9, bibl. 5.
KÖHLER, E. 633.491-2.8
Untersuchungen über das "K-Virus" der Kartoffel. 1. Mittlg. (Work on the K virus of the potato. 1st report.)
Angew. Bot., 1942, 24: 118-30, bibl. 7.
A virus spread by *Myzus persicae*.
- FOLSOM, D. 633.491-2.8
Potato virus disease studies with tuber-line seed plots and insects in Maine, 1927 to 1938.
Bull. Me agric. Exp. Stat. 410, 1942, pp. 215-50, bibl. 25.
KREUTZER, W. A., GLICK, D. P., AND MCLEAN, J. G. 633.491-2.3
Bacterial ring rot of potato.
Press. Bull. Col. Exp. Stat. 94, 1941, pp. 12.
DAINES, R. H., CAMPBELL, J. C., AND MARTIN, W. H. 633.491-2.95
Three years' comparisons of dusts and bordeaux spray for potato production in Central Jersey.
Amer. Potato J., 1942, 19: 90-6, bibl. 4.
HAYWARD, K. J. 633.491-2.78
La polilla de la papa (*Gnorimoschema operculella* Zeller) y su control. (The potato tuber moth and its control.)
Circ. Estac. exp. agric. Tucumán 108, 1942, pp. 11.
Cultural, trapping and other methods of controlling the potato moth.
1391. MUSKETT, A. E., AND COLHOUN, J. 633.52-1.531.17
Biological technique for the evaluation of fungicides. II. The evaluation of seed disinfectants for the control of seed-borne diseases of flax.
Ann. Bot., 1942, 6: 219-27, bibl. 6.
An account is given of laboratory and field methods devised for the evaluation of seed disinfectants used for the prevention of seed-borne diseases of flax. Results obtained by the laboratory method, based on the Ulster method used for the examination of flax seed samples for the presence of seed-borne parasites, show a high correlation with those obtained in the field and the laboratory method may therefore be regarded as accurate and reliable. [From authors' summary.]
1392. METCALFE, C. R. 633.525.2
Economic value of the stinging nettle.
Nature, 1942, 150: 83, bibl. 2.
The common nettle, *Urtica dioica*, yields a very strong bast fibre suitable for textile or paper manufacture. It also yields lignin, chlorophyll, and potassium nitrate. The leaves have a high protein content and are useful as fodder. Young nettle leaves have a well-known value as human food. In Germany during the present war (as during the last) the plant is being utilized to the fullest extent and even imported from neighbouring countries. The object of this note is to arouse more interest in the plant in commercial circles in Great Britain.
1393. NAUNDORF, G. 577.15.04: 633.63
Über den Einfluss einer Hormonisierung von Zuckerrübensaatgut mit Naphthylthylsäure nach dem Kurzbenetzungsverfahren unter Zugabe von Bakterienwirkstoffen auf die Entwicklung und den Ertrag der Zuckerrübe. (Naphthalene acetic acid and other treatments of sugar beet seed.)
Angew. Bot., 1942, 24: 261-73, bibl. 13.
Experiments by the author show that dipping sugar beet seed for 24 hours in a solution containing α -naphthalene-acetic acid offers considerable advantages over older methods of steeping the seed before sowing. Impregnation of seed with bacteria and bacterial products combined with dipping as above results in increased crop. Such treatment will not have its full effect unless ordinary manurial applications are also made, though the absence of nitrogen in the manure can be compensated by the use of nitrogen-forming bacteria.
1394. MAYER, A. 633.71-2.8
Concerning the mosaic disease of tobacco. (Über die Mosaikkrankheit des Tabaks.)
Landw. Vers. Stat., 1886, 32: 451-67.
IVANOWSKI, D. 633.71-2.8
Concerning the mosaic disease of the tobacco plant. (Über die Mosaikkrankheit des Tabakspflanze.)
Bull. St. Petersb. Acad. imp. Sci., 1892, 35: 67-70.
BEIJERINCK, M. W. 633.71-2.8
Concerning a contagium vivum fluidum as a cause of the spot disease of tobacco leaves. (Über ein contagium vivum fluidum als Ursache der Fleckenkrankheit des Tabaksblätter.)
Verh. konin. Akad. Wetenschappen te Amsterdam, 1898, 65: 2: 3-21.
BAUR, E. 632.8
On the etiology of infectious variegation. (Zur Aetiologie der infektiösen Panachierung.)
Ber. d. sch. bot. Ges., 1904, 22: 453-60.
The above are translations from the original by James Johnson and form *Phytopathological Classic* No. 7, 1942, pp. 62.

1395. SALMON, E. S. 633.79
*Twenty-fifth report on the trial of new varieties of hops, 1941.**
 East Malling Research Station, Maidstone, Kent, 1942, pp. 22, 6d.
 Of the 90 new hop varieties tested one cropped at the rate of 31½ cwt. to the acre, eight at 25 cwt. or more and twenty-three at 20 cwt. or more. The number of Imperial bushels of green hops required to the cwt. of dried hops varied from 80 to 137. Four of the new varieties exceeded the P.V. of 71 (i.e. α -resin $\times 10$) given by the richest sample of American hops. The preservative value of new varieties grown in England and abroad is shown. There is evidence that the new varieties, which have shown themselves very rich in soft resins at East Malling, are even richer when grown on deeper soils. Comment is made on the valuations accorded by the Hop Marketing Board to certain growths of the new varieties. Notes are given of recent successful brewing trials with the new varieties.
1396. KEYWORTH, W. G. 633.79-2.3/4 + 2.8
 Notes on hop diseases in 1941.
A.R. East Malling Res. Stat. for 1941, A25, 1942, pp. 42-3.
 Notes are given of outstanding features of the attacks of *Verticillium* wilt, nettlehead, fluffy tip, chlorotic disease and mosaic disease of hops observed in 1941. [Author's summary.] The necessity for the early control of *Verticillium* wilt is stressed.
1397. ASSOCIATION OF APPLIED BIOLOGISTS. 633.79-2.3/8
Symposium on the pathology of the hop.
Ann. appl. Biol., 1942, 29: 322-6.
 (i) WARE, W. M. 633.79-2.411
 Hop downy mildew, pp. 322-3.
 (ii) KEYWORTH, W. G. 633.79-2.8
 Verticillium wilt and virus diseases of the hop, pp. 323-4.
 (iii) MASSEE, A. M. 633.79-2.6/7
 Some important pests of the hop, pp. 324-6.
 (i) Home-made bordeaux (10-15-100), using hydrated lime, is consistently advocated as a most certain remedy for *Pseudoperonospora humuli* applied (1) when the bine has reached the top wire, (2) just before burr, (3) during burr, and (4) when the burr has fallen.
 (ii) The author notes the progress made in the study of the following diseases:—Verticillium wilt, nettlehead and mosaic.
 (iii) The following pests and their control are discussed:—hop damson aphid (*Phorodon humuli*), red spider (*Tetranychus telarius*), strig maggot (*Contarinia humili*), flea beetle (*Psylliodes attenuata*), shy bug (*Calocoris fulvomaculatus*). The fauna varies considerably in different districts. Tests of a number of insects as vectors of mosaic and nettlehead, are discussed.
1398. MICHALTSCHIEFF, T. 633.811: 633.822
 Bulgariens Rosental stellt sich um. (Exit Bulgaria's rose industry.)
Gartenbauwirtschaft, 1941, 58: 40: 2, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr., p. 91.
 The years since 1930 have seen a change over in Bulgaria from the growing of roses for oil extraction to that of peppermint for the same purpose.
1399. KHRIMLIAN, A. I. 633.812: 577.15.04
 Rooting response of geranium cuttings to their treatment with heteroauxin.
C.R. Acad. Sci. U.R.S.S., 1940, 26: 471-3.
 Callusing and root formation in geranium (*Pelargonium roseum*) cuttings were greatly hastened by treating for 24 hours with β -indolylacetic acid 20 mg. per 100 c.c. water.
1400. REINHOLD, D. 633.815
 Der Bockauer Angelika Anbau. (The production of angelica (*Archangelica officinalis*) in the Bockau district.)
Dtsch. Heilpfl., 1942, 8: 26-8, bibl. 9.
 A brief illustrated description of small-scale angelica production. The seed is best sown in late summer and the seedlings are planted out the following April or May on well-dunged soil in ridges. Artificial manures are sometimes given. Flowering is likely to occur if sowing is postponed till the spring in which case also there will be no harvest till the second year. The leafy stems are removed just before harvest after the potato harvest in October. The stems may be bought by confectionery manufacturers. The roots, which have to be loosened with a mattock, are washed and then partially dried under cover before removal into the house where the many strands of each individual root are plaited together to form each a compact mass. These are then dried in the close vicinity of the stove. The plant is said to stand cold, wet conditions but not heat and drought.
1401. KAUFMANN, H. P., AND KELLER, M. C. 633.85: 581.192
 Beiträge zur Ölsaaten-Analyse. I. Die Fettbestimmung. (Oil seed analysis. I. Fat determination.)
Fette u. Seifen, 1941, 48: 737-43, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 71.
 Problems of oil seed analysis are discussed and a new method of determining the fat content in rape, turnip and poppy seed is described.
1402. HÄRLE, A. 633.85: 633.42
 Untersuchungen zur Frage des physiologischen Knospenabfalls bei Raps und Rüben. (Premature bud shedding in turnip and rape grown for oil.)
Angew. Bot., 1941, 24: 334-52, bibl. 4.
 Experiments show that sudden changes in temperature and in soil moisture are the chief causes of premature bud shedding in turnip and rape plants grown for oil, the former in Germany being the most important cause.
1403. GERICKE, S. 633.85-1.85
 Die Phosphorsäuredüngung der Ölpflanzen. (Phosphatic manuring of oil plants.)
Forschungsdienst, 1942, 13: 117-23, bibl. 22.
 German experiments show the great importance to oil crops, in particular to rape and turnip, poppy, linseed, safflower and soybean, of adequate phosphatic manuring. These plants are found to respond with optimum returns to applications of 90 kg. P_2O_5 per ha. (80 lb. per acre). The difference in results is very noticeable between those from 90 kg. and those from 60 kg. per ha. Soybean is particularly heavy in its phosphatic demands.
1404. MAXIMOV, N. M. 633.85
 Physical and chemical data on the oil of *Xanthium strumarium* L.
C.R. Acad. Sci. U.R.S.S., 1940, 26: 393-5, bibl. 8.
 A report based on the mechanical analysis of the fruits of burweed (*Xanthium strumarium*) and on oil tests for high fatty acids and other components. As regards chemical composition there is little difference between this oil and the drying oils of the poppy types.
1405. VOSCHININ, P. K. 633.85: 581.143.26.03
 Vernalization of small-seeded sunflower.
C.R. Acad. Sci. U.R.S.S., 1939, 25: 83-6.
 The effects of different vernalization treatments and of photoperiodism and environment on small-seeded sunflower varieties are briefly noted.

* See also H.A., 12: 941.

1406. EATON, S. V. 631.811.7: 633.85
Sulphur content of seeds and seed weight in relation to effects of sulphur deficiency on growth of sunflower plants.
Plant Physiol., 1942, 17: 422-34, bibl. 17.
Seeds of sunflower plants grown to maturity with a nutrient solution lacking sulphur were fewer and much smaller than seeds grown in a complete solution, though they contained the same percentage of sulphur. The original seeds and the seeds grown with the — sulphur and the complete nutrient solutions were then sown and submitted again to complete nutrient solution and a — sulphur solution. The sizes of plants and seeds resulting are compared and discussed.
1407. DEMIDENKO, T. T., AND GOLLE, V. P. 633.85-1.436-1.8
Influence of soil temperature on the yield and uptake of nutrient elements by the sunflower.
C.R. Acad. Sci. U.R.S.S., 1939, 25: 324-7, bibl. 5.
The sunflower completes its development more quickly at temperatures ranging from 25° to 35° C. than at 13°-17° C. In the case of both nitrogen and phosphatic deficiency in the soil a rise in soil temperature increases the yield considerably in comparison with the corresponding yield at low temperature, but where potash is deficient the comparative effect of high temperature is less.
1408. DEMIDENKO, T. T., AND GOLLE, V. P. 633.85: 581.11/13
Influence of relative air humidity on the yield and uptake of nutrient elements by the sunflower.
C.R. Acad. Sci. U.R.S.S., 1939, 25: 328-32, bibl. 13.
Experiments in glass chambers show the considerable effect of the humidity of the air on the transpiration of water and also the absorption of nutrient elements by plants and the synthesis of organic substances in plants. As transpiration rises so the uptake of mineral elements increases. Under high transpiration conditions all the sunflower plants showed higher ash, calcium, phosphorus, potassium and nitrogen contents than under low transpiration.
1409. REICHERT, I. 633.88.32.491-2.4
Stem blight of the castor bean.
Palestine J. Bot. (R), 1940, 3: 269-72.
The primary infective agent concerned in stem blight of castor bean is apparently *Fusarium orthoceras* and possibly *F. semitectum*, while *Diplodia natalensis* is liable to occur after the disease has made some progress.
1410. REINMUTH, E. 633.859-2.19
Die parasitäre Blattdürre, eine für den Mohbbau bemerkenswerte Krankheit. (An important parasitic disease affecting the leaves of poppies.)
Angew. Bot., 1942, 24: 273-7.
Notes on the incidence of shrivelling of poppy leaves due to *Helminthosporium papaveris*. Control measures have not yet been entirely worked out, but it is suggested that, where there is a danger of the disease occurring, the seed should be subjected to dry pickling with some mercury compound before sowing. At the first sign of the disease in the field copper salts should be used in spray or powder form.
1411. SCHRATZ, E., AND SPANING, M. 633.88: 551.57.018
Über den Einfluss des Regens auf den Alkaloidgehalt des Stechapfels, *Datura stramonium*. (The effect of rain on the alkaloid content of stramonium.)
Disch. Heilpfl., 1942, 8: 69-72, bibl. 6.
Trials by the author and others on solanaceous plants have shown that continued rainy periods have the effect of decreasing their alkaloid content, especially in the case of stramonium. Although it has not yet been decided whether this

- decrease is due to chemical change or merely to leaching, the fact is established that to get the highest alkaloid content in stramonium it is advisable never to harvest it immediately after a heavy period of rain.
1412. SCHILLING, E. 633.52 + 633.854.54
Die Faserleistung und Ölleistung verschiedener Leinformen. (The fibre and oil production of different forms of *Linum*.)
Angew. Bot., 1942, 24: 194-220, bibl. 26.
SIDOROV, B. N., AND SOKOLOV, N. N. 547.944.6: 633.88.32.491
Production of tetraploids in *Ricinus communis* treated with colchicine.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 264-5, bibl. 3.
VOLOTOV, E. N. 547.944.6: 633.859
Polyploids in *Papaver somniferum* L. induced by treatment with colchicine.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 261-3, bibl. 11.
WERNER, R. R. 581.192: 546.15
Die Veränderung der Ölbildung unter Einwirkung von Jod. (Changes in oil production in seeds produced by iodine.)
C.R. Acad. Sci. U.R.S.S., 1940, 27: 853-6, bibl. 10.
1413. BRANDES, E. W. 633.913
Rubber from the Russian dandelion.
Agric. Amer., 1942, 2: 127-31.
A popular account of *Taraxacum kok saghyz*, the rubber plant from the Tian Shan mountains of Kazakstan in Central Asia, seed of which has recently been introduced into the U.S.A. and U.K. for planting trials. It demands humid conditions and soil of high fertility. The seed preconditioning processes are described and directions for sowing are given. The effect of fertilizers is not as yet clear. Harvesting of the seed is still laboriously done by hand, after which the seed is dried, sacked and stored. The plant can be grown either as an annual or left in the ground till the second year, when much heavier seed crops are obtainable. The roots containing the rubber are dug with a modified beet lifter, stripped of their tops, cleaned, spread and dried to about 20-30% moisture in well ventilated barns. Artificial heat can also be used, a temperature of 140° F. not being excessive. Processing consists of slicing and steaming the raw material, with lye or another coagulant added, and separating the crude rubber by decanting or centrifuging, after which it is coagulated, washed and sheeted by passing through a roller mill. The flow sheet for producing crude rubber is rather like that employed in the fabrication of sugar from sugar beet, and adaptation of some of the equipment for the dual purpose offers considerable promise.
1414. NAVASHIN, M. S., AND GERASSIMOVA, H. 633.913
The production of a tetraploid rubber-yielding plant *Taraxacum kok saghyz* Rodin and its practical bearing.
C.R. Acad. Sci. U.R.S.S., 1941, 31: 43-6, bibl. 2.
Treatment of the roots of *kok saghyz* with colchicine followed by propagation of root cuttings taken from the root systems developed from the treated roots resulted in the production of more than 100 tetraploid plants. The most interesting property of these tetraploids was the increased diameter of their latex vessels. A small amount of seed from the initial plants was sown after chilling at a temperature of 1° to 2° C. The seedlings were particularly robust with characteristic rounded leaves, which marks the triploid or tetraploid. The tetraploid progeny developed normally and some of it yielded seed in the autumn. Further selection resulted in the production of more than 100,000 seeds from tetraploid plants. Plants are being grown from them and will be under observation. It was noticed that tetraploid mother plants gave rise to many spontaneous seedlings, whereas this phenomenon was not observed in the diploid populations.

1415. SAVCHENKO, M. I. 633.913
Entwicklung und Anordnung des Milchsaftegefäßsystems bei *Taraxacum kok-saghyz*. (Development and arrangement of the latex vessel system in *kok saghyz*.)
C.R. Acad. Sci. U.R.S.S., 1940, 27: 1052-5, bibl. 2.
Trials show that the longer the period of vegetative development the greater is the opportunity for latex vessel formation in *kok saghyz*. Improvement of growth conditions for cultivated *kok saghyz* leads to the predominance of large-rooted forms. Hence the size of root, the amount of foliage of the rosette and late flowering should all form a basis for selection of this plant.
1416. MASHTAKOV, S. M., BELCHIKOVA, N. P., AND LEONOVA, M. I. 633.913: 581.192
Flowering and non-flowering plants of *kok saghyz* (*Taraxacum kok-saghyz* Rod.) compared with reference to their industrial productivity.
C.R. Acad. Sci. U.R.S.S., 1940, 28: 264-6, bibl. 5.
It was found that the absolute amount of rubber in the roots of flowering plants was always higher than that in the roots of non-flowering plants, although the actual percentage of the rubber by weight was lower. While the plants grew, the viscosity of their rubber solutions in benzene and the molecular weight of rubber kept increasing, but the process of rubber polymerization was not so intensive in the flowering plants as it was in the non-flowering. The flowering plants showed lower values both in viscosity of benzene solutions and in molecular weight of rubber. At the end of the growing season the flowering plants still contained 1.4 times more inulin in their roots than the non-flowering and were also higher in carbohydrates. Data were from single plants and from plants sown at their normal density.
1417. GHILAROV, M. S. 633.913-2.6/7
Einige Gesetzmäßigkeiten in der Ausnutzung von *Kok-saghyz* durch Insekten. (Features governing the exploitation of *kok saghyz* by insects.)
C.R. Acad. Sci. U.R.S.S., 1940, 28: 846-9, bibl. 5.
A surprisingly large number of insect types are found to support life in different parts of *kok saghyz* plants, even where the plant has only recently been introduced to the district.
1418. GHILAROV, M. S. 633.913: 581.162.3
Die Bestäubung von *Taraxacum kok-saghyz* Rod. bei Pflanzbedingungen. (Pollination of cultivated *kok saghyz*.)
C.R. Acad. Sci. U.R.S.S., 1941, 30: 848-50.
Observation made in the Kursk district show that the pollination of *kok saghyz* is assured in that district both by hive bees and a large number of flies and other insects.
1419. RUNOV, V. I., AND SVERDLINA, K. 633.913-1.531
Temperature coefficient and activation energy in the seeds of *tau saghyz* as influenced by environmental temperature.
C.R. Acad. Sci. U.R.S.S., 1940, 29: 132-4, bibl. 6.
1420. PEPPER, B. B. 632.76: 635.13 + 635.53 + 635.78
The carrot weevil, *Listronotus latiusculus* (Boe), in New Jersey and its control.
Bull. New Jer. agric. Exp. Stat. 693, 1942, bibl. 13.
The most effective control of this pest of celery, carrots and parsley was obtained with a poison bait of 95 lb. dried apple pomace and 5 lb. calcium arsenate broadcast at the rate of 40 to 50 lb. per acre per application every 15 to 20 days.
1421. BRISON, F. R. 635.25: 631.531
The influence of storage conditions upon the germination of onion seed.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 501-3, bibl. 1.
Trials at College Station, Texas, confirm the findings of Beattie and Boswell that onion seed remains viable longer when stored in sealed containers and when stored at a low temperature, 34-40° F., rather than at a relatively high one, 40-95° F. They also suggest the value of sealing under vacuum for stocks destined to stop for long periods under common store conditions.
1422. CHANDLER, F. B. 635.34/35: 632.19: 546.27
Boron deficiency symptoms in some plants of the cabbage family.
Bull. Me agric. Exp. Stat. 402, 1940, pp. 155-87, bibl. 27.
A deficiency of boron causes plants to be dwarfed and to have curled, rolled leaves, often with chlorotic margins. The part of the plant which is grown for the market is most severely affected in size and quality. Boron deficiency has been observed in a large number of towns in southern and eastern Maine. Boron deficiency may be corrected by the use of 10 lb. per acre of borax applied in the row for row crops. Borax may be applied with the fertilizer, as a side dressing, or it may be applied in solution as a spray. In setting out plants, boric acid solutions may be used, the solution being poured into the holes prepared to receive the plants. [Author's summary.]
1423. CHANDLER, F. B. 635.34/36: 632.19: 546.27
Mineral nutrition of the genus *Brassica* with particular reference to boron.
Bull. Me agric. Exp. Stat. 404, 1941, pp. 307-400, bibl. 27.
The results are given of numerous experiments with different cultivated *Brassica* plants in sand and water cultures. Conclusions reached contain the following:—*Brassica* plants do not normally contain enough boron in their seeds to develop cotyledons and first leaves. Boron deficiency symptoms vary with the kind and age of plant when boron is a limiting factor. The symptoms are curling and rolling of leaves, rugosity of leaves, chlorosis of leaf margins, swelling of stem and petioles, brittleness of petioles, splitting of petioles and stem, corky appearance of petioles and stem, development of brown areas in stems, reduction in size and quality of edible parts. A deficiency of boron dwarfs the plants. Plants may receive all their boron through the leaves. No single element tried (N, P, K, Ca, Mg) affects boron deficiency. All the particular symptoms of boron deficiency noted are secondary expressions of the alteration and retardation of meristematic activity.
1424. BRANDENBURG, E. 635.35 + 635.348: 546.27
Über Bormangel an Blumenkohl und Kohlrabi. (Boron deficiency in cauliflower and kohlrabi.)
Angew. Bot., 1942, 24: 99-113, bibl. 2.
A description of boron deficiency symptoms in cauliflower and kohlrabi.
1425. WOODMAN, R. M. 635.52: 631.8
The nutrition of lettuce.
Ann. appl. Biol., 1942, 29: 213-8, bibl. 8.
The author has already given an account of his sand culture trials with lettuce (*Ibidem*, 27: 5-16; *H.A.*, 10: 1057). Here he describes soil culture experiments carried out partly by the triangle method. The soil used both in pot and field trials at Cambridge was old river gravel. He summarizes as follows:—It is shown that mixtures of fertilizers containing high nitrogen gave the best response with the soil used. Nitrogen alone, but not phosphate or potash alone, gave a response; mixtures of nitrogen and phosphate, nitrogen and potash, and phosphate and potash, also gave increased yields. In some parallel field trials carried out on the same soil, the complete fertilizer resulted in a significant increase; all plots receiving fertilizer of any kind also gave a response over no fertilizer; the groups of plots receiving nitrogen, phosphate, and potash, gave a significant response over the nil plot; and all plots receiving potash gave a response over all others.

1426. ALEXANDER, T. R. 635.62: 632.19: 546.27
Anatomical and physiological responses of
squash to various levels of boron supply.
Bot. Gaz., 1942, 103: 475-91, bibl. 30.

The external and anatomical responses of squash (*Cucurbita maxima* var. Chicago Warted Hubbard) to various degrees of boron deficiency are recorded, squash being particularly sensitive to such deficiencies.

1427. FILOV, A. I. 635.63
A tentative classification of cucumbers based on
their ecological evolution.
C.R. Acad. Sci. U.R.S.S., 1940, 26: 811-4.

A discussion of the characters of six subspecies of *Cucumis sativus*, five of them bearing clearly expressed features of ecological differentiation. They are European-American—to which some of our English cultivated varieties belong; West-Asiatic—a very xerophytic species; Chinese—with very large, long fruit and coarse semi-glossy rind, containing a number of English greenhouse varieties; and Indo-Japanese, Himalayan and hermaphrodite.

1428. NICOLAISEN, N. 581.192: 635.64 + 635.65
Fremdbefruchtung bei den Kulturtomaten und
Stangenbohnen. (Cross pollination in tomatoes
and runner beans.)
Forschungsdienst, 1942, 13: 124-9.

Trials in Germany show that cross pollination can occur both in tomatoes and in beans. Plants of tomato grown for seed production which differ markedly in morphological characters should be separated by at least 50 metres. In beans the danger of cross pollination is likely to be even more serious and an interval of 300 m. is laid down as optimum. In particular the different sorts of bean such as runner, dwarf, stringed and stringless, green podded and yellow podded should be extremely well separated.

1429. MURPHY, E. F. 577.16: 635.64 + 635.34
The ascorbic acid content of different varieties of
Maine-grown tomatoes and cabbages as influenced
by locality, season and stage of maturity.
J. agric. Res., 1942, 64: 483-502, bibl. 19.

Trials with 2 low-vitamin and 2 high-vitamin tomato varieties and 4 types of cabbage were made in different localities in Maine in 1938 and 1939 [cabbages 1939 only]. The results showed that environmental agencies markedly influence the synthesis of vitamin C in tomatoes and cabbages and that geographical situation is not in itself a contributory factor. An analysis of weather data provided a sure basis for the assumption that sunlight, rainfall and probably temperature may all cause variations in ascorbic acid. There is evidence that if a low vitamin tomato variety were submitted to adverse environmental conditions it would contain next to no vitamin, but if a high-vitamin variety were submitted to similar conditions it would still contain appreciable amounts of vitamin C.

1430. TINCKER, M. A. H. 635.64: 577.16
The effect of vitamins in yeast extract upon the
growth of tomatoes.
J. roy. hort. Soc., 1942, 67: 271-3, bibl. 6.

Experiments carried out at Wisley in 1941 on the tomato Radio confirm the findings of other workers that the tomato, if supplied with the usual nutrients, can make sufficient vitamin B₁ for its own purposes. Neither injection of the plants nor the application of the vitamin to the soil increased the vitamin content of the fruit.

1431. HAGEMAN, R. H., HODGE, E. J., AND MCHARGUE, J. S. 546.15: 635.64: 577.16
Effect of potassium iodide on the ascorbic acid
content and growth of tomato plants.
Plant Physiol., 1942, 17: 465-72, bibl. 10.

Tomato plants in sand cultures were treated with potassium iodide containing from 4 to 100 p.p.m. iodine. The lowest

concentrations did not reduce the growth of plants as measured by weight, but 16 p.p.m. iodine concentrations seriously curtailed growth and production. Manganese and copper uptake of the treated plants was more pronounced than that of any of the other minerals. All concentrations of potassium iodide caused a marked decrease in ascorbic acid content of the plants.

1432. HAMNER, K. C., LYON, C. B., AND HAMNER, C' L. 635.64: 631.8: 577.16
Effect of mineral nutrition on the ascorbic-acid
content of the tomato.
Bot. Gaz., 1942, 103: 586-616, bibl. 9.

The influence of macro-nutrient supply on the ascorbic acid content of Bonny Best tomatoes was tested in two experiments and that of climatic environmental factors in two others. It was possible in sand cultures to correlate growth and fruitfulness with minor variations in nutrient composition. These are discussed. In general, variations in calcium and nitrate had the greatest effect on growth and fruitfulness. Ascorbic acid content of fruits was significantly higher in some sulphate-deficient treatments and significantly lower in potassium and phosphate deficiencies than average. Otherwise no effects of nutrients on ascorbic acid were observed. The fruit of autumn and winter grown plants contained only about half as much ascorbic acid as summer grown fruits. Location influence was observed—not due to soil. Sand cultured plants produced as much ascorbic acid in their fruits as soil grown plants. The possible practical significance of the results obtained is discussed.

1433. HAMNER, M. E. 577.15.04: 635.64
Effect of phenylacetic acid and naphthalene
acetamide on tomato plants grown in soil.
Bot. Gaz., 1942, 103: 576-80, bibl. 4, being
Contr. Hull. bot. Lab. 539.

The results of adding phenylacetic acid and naphthalene acetamide to the soil of tomato plants grown in crocks did not support the rather generalized claim that the growth of plants is greatly increased when small quantities of these substances are added to the soil.

1434. VASSILIEV, I. V. 635.64: 581.162.3: 546.27
Effects of boron on germination of pollen and
growth of pollen tubes in tomato (*Lycopersicon
esculentum* Mill.).
C.R. Acad. Sci. U.R.S.S., 1941, 30: 532-4.

Trial shows that tomato pollen germination and tube growth are stimulated by the addition of boric acid to a sugar solution medium. The most satisfactory medium was found to be a 15% sugar solution with the addition of 0.003% boric acid, though quite satisfactory results were obtained with concentrations of from 0.001 to 0.01% boric acid.

1435. BONNER, J. 577.16: 581.144.2
Riboflavin in isolated roots.
Bot. Gaz., 1942, 103: 581-5, bibl. 2.

The riboflavin content of 1 cm. root tips from aseptically germinated seedlings of 5 different species (alfalfa, clover, *Datura*, sunflower and tomato) was determined, in each case a similar root tip or tips being cultured *in vitro*. The evidence suggests that in all the species tested a synthesis of riboflavin took place.

1436. ELZE, D. L. 635.64: 632.19: 547.25.77
Molybdenum injury of tomato plants.
Palestine J. Bot. (R), 1940, 3: 154-7, bibl. 4.

Experiments with potted tomato plants indicate that the molybdenum tolerance of tomato plants lies between 6.8 and 13.5 mg. per plant. Toxic symptoms observed are compared with those found by Warrington, *Ann. appl. Biol.*, 1937, 24: 475-93.

1437. SELMAN, I. W. 635.64: 632.8
The relation between mosaic infection and yield reduction in glasshouse tomatoes.
J. Pomol., 1942, 20: 49-58, bibl. 15.
Previous work by the author at Cheshunt had shown that crop reduction in tomatoes due to early infection by mosaic was associated with three important effects, viz. reduction in number of flower buds differentiated, failure of flower buds to set and mature fruits and slight reduction in average fruit weight. In the present trials an attempt was made to overcome some of these known effects by controlling certain environmental factors. The observations of two successive seasons showed that effects of early infection were:— (a) reduction in number of fruit produced; (b) non-significant reduction in average fruit weight; (c) reduction in yield of ripe fruit; and (d) increase in percentage of weight of fruit showing blotchy ripening. The fact that there was no reduction in the number of flower buds or in leaves produced or in growth rate of stem is attributed to improved cultural methods. The importance of the partial failure of the flowers to set fruit in the inoculated plants in relation to final yield is stressed. Two causes are believed to contribute to failure to set fruit, namely (1) shortage of available carbohydrate within the plant and (2) high water-loss/water-uptake ratio in the plant. The relative reduction in fruit yield due to early infection was 22.3% in 1940 and 13.4% in 1941.
1438. HOFMEYER, J. D. 635.64: 632.48
A new tomato resistant to *Fusarium* wilt disease.
Fng S. Afr., 1942, 17: 356.
Seeds of *Fusarium*-immune tomatoes will be available in September to farms in South Africa on which the disease is prevalent. The seed is selected from the immune plants resulting from crosses in U.S.A. of horticultural varieties with the immune wild tomato, *Lycopersicon pimpinellifolium*. It is not claimed that these immune plants are the last word, since they possess various faults of fruit quality and character, but they enable tomatoes to be grown where previously *Fusarium* had made it impossible, and meanwhile a breeding programme to eliminate unfavourable characters is in progress.
1439. OYLER, E., AND READ, W. H. 635.64: 632.4
A stem rot of tomato caused by *Didymella lycopersici*.
Gdnrs' Chron., 1942, 112: 120, bibl. 3.
After a gradual diminution since 1918, *Didymella lycopersici*, the causal fungus of stem rot of tomato, has again become serious both under glass and in the open. The disease first appears as a dark brown lesion girdling the base of the plant just above soil level. Numerous small black pycnidia appear on the surface of the lesions and the plant wilts and dies. The cortex of the stem rots and can be scraped off with a knife. Secondary lesions, originally from air-borne spores, occur later at higher levels. Fruits are generally attacked at the calyx end and fall from the plant. Leaves are also attacked and die. The fungus can overwinter in the soil and prove a danger to a succeeding tomato crop. Sterilization of the soil by heat or chemical means will doubtless provide control but tomatoes grown in the sterilized soils produce the type of growth most susceptible to the disease. Remedial measures, once the plant is attacked, appear to be impracticable. During experiments at Cheshunt it was found that the application of petroleum oil against red spider or petroleum oil-copper fungicides increased susceptibility to *D. lycopersici* attack.
1440. HILDEBRAND, E. M. 635.64: 632.314
A microcurial study of crown gall infection in tomato.
J. agric. Res., 1942, 65: 45-59, bibl. 18.
Mainly on the relation of inoculation technique to infection.
1441. FILOV, A. I. 635.646
An agro-ecological classification of egg-plants and a study of their characters.
C.R. Acad. Sci. U.R.S.S., 1940, 26: 815-8.
A discussion of the different ecotypes of eggplant, *Solanum melongena*, belonging to the following cultivated sub-species: S. Western Asiatic, East Asiatic, Palestinian and Arabian. The importance to the breeder of studying ecological influences is emphasized.
1442. HÄHNE, H. 635.65: 632.3
Beiträge zur Frage der Bekämpfung der durch *Pseudomonas medicaginis* var. *phaseolicola* Burkh. verursachten Fettfleckenkrankheit der Bohne. (Control of halo blight of beans.)
Angew. Bot., 1942, 24: 31-61, bibl. 8.
Halo disease of beans has lately become so widespread in Germany that the use of seed harvested from non-infected fields is impossible. The removal of obviously infected seed before sowing does not remove all infected seed. The removal of obviously infected plants also leaves infected plants behind. Pickling will only be effective for those seeds which are outwardly infected. Beans in general will not stand hot water treatment. Attempts are in progress to produce immune varieties, meantime the use of 1% bordeaux spray on the growing plants has given a fair degree of protection and it is thought that a $\frac{1}{2}$ % solution might do equally well.
1443. WOLF, B. 635.653: 631.8
Chemical factors influencing the set of Henderson Lima beans.
J. Amer. Soc. Agron., 1942, 34: 646-50, bibl. 6.
Well set plants had substantially higher concentrations of nitrate nitrogen, potassium, available calcium and magnesium but less available phosphorus than poorly set plants. The concentrations of nitrate nitrogen and of available calcium in the main stems were closely associated with seed set. Nitrate nitrogen concentrations from 2,250 to 4,000 p.p.m. were always associated with good set, as was over 9,000 p.p.m. of calcium. Plants with less than 6,000 p.p.m. of calcium always had a bad set. In the soil organic matter increased set and yield.
1444. PSAREV, G. M., AND VESELOVSKAYA, K. A. 635.655: 612.014.44
Growth response of soya to daylength in relation to development.
C.R. Acad. Sci. U.R.S.S., 1941, 30: 844-7, bibl. 15.
The growth response of soya bean to day length varies according to the group to which it belongs, whether Manchurian, Japan, China or Indian group. These differences in response are discussed.
1445. FELS, C. V. 635.656
Peas.
J. roy. hort. Soc., 1942, 67: 257-60.
A classification of garden peas based on trials over many years of sowings made the last week in March. The peas are grouped according to their season, e.g. early, maincrop or late, by height and by time taken to reach first picking. Introductions of the past four years are not included. It is noteworthy that all the most popular and notable varieties have been raised by English seed houses and that most of the garden peas grown in U.S.A. have been introduced from England. This classification is claimed to be unique in that it alone gives the length of time to first picking, useful information for growers wishing to arrange for a succession of pickings. Over 1,400 so-called varieties were studied but fortunately [the author says unfortunately] most of them were synonyms. A full list of these, giving in each case the size of pod, colour and type of seed, can be consulted at the Lindley Library, Vincent Square, London, or at Wisley.

1446. ZAZHURILO, V. K. 635.656: 632.48

Pea varieties with pods resistant to *Ascochyta pisi* Lib.

C.R. Acad. Sci. U.R.S.S., 1940, 29: 351-2.

Although all pea varieties tested at the Voronezh Plant Protection Station were susceptible to *Ascochyta pisi*, the pods of a few of them, viz. Folger Heine, Waxy 019, Concordia and Mench, all showed infection in less than 5% of their pods.

1447. MEUNISSIER, E. 635.657

Le pois chiche. (The chick pea.)

Rev. hort. Suisse, 1942, 15: 109-11, bibl. 11.

The chick pea, *Cicer arietinum*, reputed to have derived its generic name from its resemblance to an excrescence decorating the nose of the orator Cicero, has been grown from the earliest times although not universally appreciated. Dr. Leclerc (*Légumes de France*) remarks that the flavour is strangely reminiscent of wet dog, and other writers have been equally unflattering. This unpleasant taste can be avoided and an agreeable flavour substituted if the pods are picked a week or so before they are fully dry. In northern France the sun is insufficiently strong for the crop to be always dependable. Cultivation in the warmer parts is simple. A deep and dry silicious clay soil, well manured and kept clean with a couple of hoeings during the growing season, is all that is necessary. From the nutritional point of view it compares well with the haricot bean. The dried foliage makes a good fodder. The most serious disease is anthracnose. Affected plants should be destroyed.

1448. MORGAN, E. J. 635.78: 577.16

Parsley as a rich source of vitamin C.

Nature, 1942, 150: 92-3, bibl. 14.

Parsley owing to its high vitamin C content is suggested as a useful substitute for the citrus and other fruits now denied to the public. The consumption of $\frac{1}{2}$ oz. of parsley per day will give complete protection with a diet lacking vitamin C. Ways in which parsley, though best eaten freshly picked, could be served at table with the vitamins more or less intact are suggested. A recipe is given for parsley lemonade. It is also noted that parsley contains 1.42 mgm. of available iron per oz.

1449. NIETHAMMER, A. 635.8

Beiträge über die Kulturfähigkeit des Champignons *Psalliota campestris*. (Cultivation of the mushroom on various media.)

Zbl. Bakt. (Abt. 2), 1942, 105: 127-8, bibl. 6.

A report on the cultivation of the mushroom on various media to certain of which nutrient solutions were added. The media were wort, soil decoctions, wood shavings and oat spelt.

1450. REICHERT, I. 635.8

Studies on mushrooms and other fungi of the forests of Palestine. I. *Boletus boudieri* Qué! and *B. bellini* Inzenga. II. Geography and origin of two *Rostkovites* (*Boletus*) mushrooms. Palestine J. Bot. (R), 1940, 3: 209-24, bibl. 26, 3: 233-58, bibl. 45.

REICHERT, I. 635.8

On the genus *Xerocomus* Qué!.

Palestine J. Bot. (R), 1940, 3: 225-32, bibl. 14.

1451. PYKE, M., AND MELVILLE, R. 635.937.34: 577.16

Vitamin C in rose hips.

Biöchem. J., 1942, 36: 336-9, bibl. 4.

A survey of the vitamin C content of the ripe hips of a number of British rose species showed a close correlation between the latitudinal range and the vitamin content of their hips. Thus species growing in the north were richer in vitamin C than the same or other species growing in

the south. The ascorbic acid content appears to be a constitutional character not readily altered, i.e. the transplanting of *Rosa mollis* var. *typica* from Scotland to Middlesex did not alter the vitamin content in subsequent fruitings. The reasons for the latitudinal variation remain undiscovered. The vitamin C content of British species often exceeds 1% of the flesh of ripe hips. The hips of a number of foreign rose species also examined had a vitamin C content much higher than any native species, in particular *R. elymaitica*, *R. fedtschenkoana*, *R. macrophylla*, *R. moyesii*, *R. nutkana*. That of *R. fedtschenkoana* was 4-8%.

1452. DARLINGTON, C. D. 577.16: 635.937.34

Vitamin C and chromosome number in *Rosa*.

Nature, 1942, 150: 404, bibl. 11.

Commenting on the results obtained by Pyke and Melville (see previous abstract) Darlington suggests that they indicate that polyploidy goes with and may in itself determine an increase in vitamin C production. This conclusion could be tested by the experimental doubling of the chromosome number in diploid and tetraploid forms; the results would probably have both particular and general value.

1453. SABALITSCHKA, T., AND MICHELS, H. 635.937.34: 577.16

Verhalten des Vitamin C Gehaltes von Hage-

budden verschiedenen Reifegrades beim Ernten

und Nachreifen. (Ripeness affects vitamin C

content of rose hips both at picking time and on

after-ripening.)

Angew. Bot., 1942, 24: 233-47, bibl. 3.

Hips collected from various roses in varying states of ripeness showed increasing vitamin C content up to ripeness and then a decline. Vitamin C content of unripe hips either did not or only just increased on after-ripening. In general vitamin content fell with after-ripening or storing and this was the more noticeable, the riper the hips. Hence ripe (not over-ripe) hips still contained more vitamin C after storing than unripe, their original content having been higher. Unripe and after-ripened hips never attain the vitamin content of those ripened on the bush. Hence picking and leaving to after-ripen is not recommended. Relations are found to exist between colour and vitamin content in hips from the same rose picked at different degrees of ripeness or treated differently or in hips coming from different rose bushes.

1454. MUNERATI, O. 633.41

The duration of the beet cycle.

Int. Rev. Agric. Rome (Mon. Bull. agric. Sci. Pract.), 1942, 33: 177T-214T, bibl. 264.

SMITH, W. P. C. 633.52-2.4

Flax rust [*Melampsora lini*].

J. Dep. Agric. W. Aust., 1942, 19: 56-63.

KNIGHT, C. A., AND LAUFFER, M. A. 633.71-2.8

A comparison of the alkaline cleavage products

of two strains of tobacco mosaic virus.

J. biol. Chem., 1942, 144: 411-7, bibl. 6.

SAKR, EL. S., AND THOMPSON, H. C. 635.13: 632.8

Effect of infecting carrot plants with certain

viruses on seedstalk development.

Plant Physiol., 1942, 17: 500-2, bibl. 6.

BROWN, R. 635.61: 581.143

The gaseous exchange of seeds and isolated

cotyledons of *Cucurbita pepo*.

Ann. Bot., 1942, 6: 293-321, bibl. 18.

BARKER, H. A., AND BROYER, T. C. 635.62: 631.811.9: 546.711

Notes on the influence of microorganisms on

growth of squash plants in water culture with

particular reference to manganese nutrition.

Soil Sci., 1942, 53: 467-77, bibl. 6.

HEINZE, P. H., PARKER, M. W., AND BORTHWICK, H. A. 635.655: 631.541

Floral initiation in Biloxi soybean as influenced by grafting.

Bot. Gaz., 1942, 103: 518-30, bibl. 12.

DAVIS, J. F., COOK, R. L., AND BATEN, W. D. 635.656: 631.8: 519

A method of statistical analysis of a factorial experiment involving influence of fertilizer analyses and placement of fertilizer on stand and yield of cannerly peas.

J. Amer. Soc. Agron., 1942, 34: 521-32.

FLOWER GROWING.

1455. MODLIBOWSKA, I. 635.939.183: 581.162.3
Bimodality of crowded pollen tubes in *Primula obconica*.

J. Hered., 1942, 33: 187-90, bibl. 6.

In *Primula obconica* and other plants with dry stigma excessive pollination leads to the arrest of late-growing pollen tubes in the top of the style. Thus the effect of crowding is to simulate partial incompatibility. [Author's summary.]

1456. WARNE, L. G. G. 635.937.34
The growth of rose stocks.

J. roy. hort. Soc., 1942, 67: 359-61.

The relative vigour was examined of commercial rose stocks kokulensky, multiflora, laxa, Brog's canina, rugosa, polmeriana, all pot-grown under identical conditions. Brog's and multiflora proved the most and rugosa the least vigorous. It was not determined whether the stock can impart its vigour to the scion, but meagre data from a single experiment suggest that it may not be able to do so.

1457. BOND, L. 639.939.514: 547.944.6
Colchicine stimulation of seed germination in *Petunia axillaris*.

J. Hered., 1942, 33: 200-1, bibl. 5.

Seed treatment with weak solutions of colchicine (e.g. 0.04% with *Petunia axillaris*) is likely greatly to increase germination while yielding satisfactory results in the production of large numbers of polyploid plants. In the case of *P. axillaris* the germination time was also shortened.

1458. PAPE, H. 632.48: 635.939.98
Die Alternaria-Krankheit der Zinnie und ihre Bekämpfung. (*Alternaria* disease of zinnias and its control.)

Angew. Bot., 1942, 24: 61-79, bibl. 24.

Notes are given of varietal susceptibility of zinnias to *Alternaria* disease. Excessive nitrogenous and insufficient

potassic manuring favour the disease. Seed pickling kills the spores but also some of the seed. The use of fungicide sprays and changing the site of the zinnia bed from year to year are recommended.

1459. BRIERLEY, P., AND CURTIS, A. H. 635.935.722
Further studies of cool storage and other factors affecting the forcing performance of Easter lily bulbs.

J. agric. Res., 1942, 64: 221-35, bibl. 8.

An abstract of this was given in *Proc. Amer. Soc. hort. Sci. for 1941*, 39: 432, noted H.A., 12: 546.

Considerable variance in flowering dates of Creole Easter lilies was achieved by different treatments, which included (1) planting in greenhouse immediately after digging; (2) storing at 50° F. for 5 weeks; (3) storing at 32° F. for 10 weeks; (4) storing at 80° for 3 weeks in open trays and then at 50° for 15 weeks, and (6) storing at 80° for 3 weeks in open trays and then at 32° for 10 weeks. Results are discussed at some length and their practical interest is noted as regards both earliness and extension of the flowering period.

1460. RANDALL, G. O., AND WEAVER, J. G. 635.932
Herbaceous perennials for North Carolina.

Bull. N. Carolina agric. Exp. Stat. 333, 1942, pp. 40. Or how to make a flower border—a very refreshing thought.

BLANTON, F. S. 635.944: 632.944
Methyl bromide fumigation for control of the narcissus bulb fly.

J. econ. Ent., 1942, 35: 239-41.

CITRUS AND SUB-TROPICALS.

1461. COSSMANN, K. F. 634.3: 581.144.2
Citrus roots: their anatomy, osmotic pressure and periodicity of growth.

Palestine J. Bot. (R), 1940, 3: 65-104, bibl. 38.

The author's observations were made on the following varieties and strains:—Sweet lime (*Citrus limetta* Risso(?)), rough lemon and sour lemon (*C. limonia* Osb.), citron (*C. medica* L.), Baladi and Shamouti sweet oranges (*C. sinensis* Osb.), sour orange (*C. aurantium*), Duncan grapefruit (*C. paradisi* Macf.) and Goliath shaddock (*C. maxima* Merrill). She confirms but widens considerably Penzig's findings on the structure of citrus roots (Studi botanici sugli agrumi e sulle piante affini, *Annali di Agricoltura*, Rome, 1877). She finds the following characters to be of taxonomic importance:—mode of lignification of pith, configuration of the protoxylem strands, suberization in the endodermis, thickening of walls in the epidermis. All the varieties studied had root hairs seldom more than 1/10 mm. long. The occurrence and size of root hairs was greatly influenced by soil moisture. Osmotic values were found to vary considerably with the variety and to be inversely

proportional to the moisture content of the soil. Remarkable agreement was established between the level of osmotic value of roots and time of endodermal suberization on the one hand and the adaptability of varieties to light soils on the other. There are indications that the factor limiting the intensity of root growth in the moist conditions of winter is soil temperature and in dry summer soil humidity.

1462. LAL SINGH AND SHAM SINGH. 634.3-1.541.11
Citrus rootstock trials in the Punjab. I. The vigour of young trees of sweet orange, mandarin and grapefruit as influenced by different rootstocks.

Indian J. agric. Sci., 1942, 12: 381-99, bibl. 48.

The report discusses some preliminary results of a citrus rootstock investigation begun in 1937 at Montgomery, Punjab, to determine the most suitable stocks for sweet orange (Malta), mandarin (sangtra) and grapefruit in that district. The present studies cover only the vegetative phase of the young trees. (a) *Kharna khatta* (*C. karna* Raf) is associated with the most vigorous trees irrespective

of scion variety; (b) *Jatti khatti* or rough lemon (*C. limonia* Osbeck) also gives vigour to its scion but to a lesser extent; (c) *Mitha* or sweet lime (*C. aurantifolia* var. Swingle) is a dwarfing stock; (d) *Nasnaran* (*C. japonica* Thunb.) imparts vigour to sweet orange but dwarfs mandarin. *Mokari* citron (*C. medica* L.) imparts vigour to mandarin, but dwarfs sweet orange and grapefruit; (e) grapefruit on *chakotra* or shaddock shows mottled leaves, the cause being not yet determined. Instances are given to show that the vigour of an unworked rootstock is no criterion of its vigour when grafted with certain scion varieties, e.g. the comparatively dwarf *nasnaran* when grafted with sweet orange gives rise to very vigorous trees, whereas the dwarfing *mitha* ungrafted is vigorous and spreading.

1463. IVANOV, S. M. 634.3-2.111
Frost resistance of citrus plants as controlled by day length.

C.R. Acad. Sci. U.R.S.S., 1940, 28: 736-8, bibl. 5.

Experiments with pot plants of lemon, Unshui mandarin and orange at the Sukhum Institute showed that short days tend to increase frost resistance in citrus, the most responsive to the influence being lemon followed by orange, while the mandarin shows little if any effect. With decreasing day length not only is the active growth of shoots completed sooner, but the functional activity of cells connected with growth decreases in energy after the active growth and lignification of young shoots has come to an end. A comparison of the frost resistance of various plants on the basis of their glutathione content shows that frost resistance increases as the content of glutathione is reduced owing to decreased day length.

1464. OPPENHEIMER, H. R., AND ELZE, D. L. 634.3-1.67
Irrigation of citrus trees according to physiological indicators.

Palestine J. Bot. (R), 1941, 4: 20-46, bibl. 36.

It is shown that the moisture deficit in trees, as determined by simple injection tests of the leaves with kerosene and by measurements of apparent fruit growth, can be used as an indication of irrigation needs. In the kerosene test 5-10 leaves, preferably those in sunlight, are picked at intervals of about a minute during the 3rd hour after sunrise in normal weather. The leaf is held upside down and a small drop of kerosene applied to the under-surface. If irrigation is unnecessary one of the following results will occur: (a) one big greasy spot will form immediately; (b) very numerous small spots soon coalescing will form within 5 seconds; (c) less numerous but not rare small spots will form within 3 seconds. The tree needs irrigation (a) if only rare or scattered spots occur after 3 seconds or more rarely, (b) very numerous small spots appear after more than 5 seconds. To make the growth test 10 fruits on each tree are tagged early in June and their circumference is noted weekly. The records of increments of circumference are converted to increments of volume. Water is unnecessary as long as the increment remains above three-quarters of a standard which in medium Jaffa oranges amounts to 1.5 c.c. a day. If below this standard water should be given at once. In practice it is well to set up a standard of the normal average daily fruit growth of one or more irrigation intervals for each orchard. These methods render unnecessary the use of soil moisture data, always difficult to apply owing to the great range of soil textures in Palestine. The experiments leading to these and other conclusions are discussed fully.

1465. SOUTHWICK, R. W. 634.3-1.67
Irrigation of citrus.

Calif. Citrogr., 1942, 27: 243, 264.

The article is described by its sub-title "Some practical advice on duty of water and how best to make it do its job".

1466. CHAPMAN, H. D., AND PARKER, E. R. 634.31-1.84
Weekly absorption of nitrate by young, bearing orange trees growing out of doors in solution cultures.

Plant Physiol., 1942, 17: 366-76, bibl. 10.

Three years' trials are recorded from California on the weekly absorption of nitrate by two young bearing Valencia orange trees growing out of doors in complete nutrient solutions. Maximum absorption occurred each year in late spring, summer and autumn, minimum absorption taking place in January and February on each occasion. Periods of rapid nitrate absorption were usually associated with periods of active root growth, though substantial amounts were absorbed by roots which had become partly suberized. Water absorption was more closely related to cycles of active top growth or rather to the physiological activities associated with root and top growth. From January to March each year there was no new root growth, and spring blossom and leaf cycle had completely emerged before the first signs of new root growth became manifest.

1467. HALMA, F. F. 634.334-2.111
Rebuilding cold-injured lemon trees.

Calif. Citrogr., 1942, 27: 220, 233.

The lemon trees rebuilt after the 1937 frosts according to the system described here compare favourably at about half the cost with replants made shortly after the frosts.

1468. DE VILLIERS, J. I. 634.3-2.19: 546.47 + 546.46
Trace element deficiencies in citrus.

Fmg S. Afr., 1942, 17: 337-40, bibl. 1.

Describes the diagnosis and remedy for zinc and magnesium deficiency in citrus. Zinc deficiency symptoms are illustrated.

1469. COWART, F. F. 634.323-2.19-1.811.6
The effect of magnesium deficiency in grapefruit trees upon the composition of fruit.

Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 161-4, bibl. 6.

Experimental data from Florida indicate that magnesium deficiency in grapefruit—Duncan and Marsh—leads to a lowering of the components which are largely responsible for internal quality of the fruit. The improvement in quality due to the addition of magnesium-bearing materials to magnesium-deficient trees results from the great increase in leaf area and efficiency of the foliage on such trees.

1470. ETINGER-TULCZYNSKA, -R., AND ELZE, D. L. 634.3-1.847.2
Occurrence and stimulation of azotobacter in some agricultural soils of Palestine.

Palestine J. Bot. (R), 1941, 4: 1-10, bibl. 12.

The numbers of azotobacter in Palestine soils were found to increase considerably when orange juice with chalk and phosphate were added. Oranges entire or cut promoted the growth of the organisms when applied alone, though the addition of lime increased the effect. The treatment producing the greatest effect, increasing the number of colonies per sq. cm. of soil plate from 129 to 1,130 was the burying in the irrigation basins of 4 field boxes of cut oranges + 1 kg. lime per tree.

1471. LOEST, F. C. 634.3-2.4
Dry root rot disease of citrus trees.

Fmg S. Afr., 1942, 17: 420-4.

Dry root rot disease of citrus has killed many citrus trees in South Africa. All or parts of the tree develop permanent wilting followed by complete defoliation, a process which may be rapid or slow. The defoliating branches often bear undersized and mottled leaves. Triumph grapefruit when attacked characteristically develops gum exudation from cracks in twigs and branches. In the root system the skin of the bark becomes detached from the main cylinder,

causing first the fibrous root system to decay and then in turn the secondary and the crown roots. The bark of the trunk then cracks and splits and finally collapses. The death of the bark is followed by the death of the cambium and wood. The latter becomes corky in appearance and is easily crumbled. The cause of the disease, hitherto obscure, has now been attributed by the author to the fungus *Diplodia natalensis*. Main contributing conditions are bad soil aeration, chiefly from over-irrigation, a low nitrogen level from excessive leaching, the planting of weak trees and root damage during cultivation. There are other aspects of pre-disposition not fully understood. When inoculated into the roots of vigorously growing citrus trees the fungus progresses to varying distances only along the inoculated roots. Control therefore consists in keeping the trees in a vigorous condition and suggestions to this end are made. Illustrations of the various features are provided.

1472. MCGREGOR, E. A. 634.3-2.654.2

Recently discovered mite on citrus.

Calif. Citrogr., 1942, 27: 270, bibl. 1.

A mite, *Tarsonemus bakeri*, which seems hitherto to have escaped observation, has been found to be fairly general in the citrus groves of California. The mites were first found in the bracts of the buds which grow at the base of the leaf stem, causing the bud tips to turn brown and die. Examination of a large number of groves revealed that the mite was present in all cases, the average infestation being 62.9% of the small lemons. The mite was found to confine itself almost entirely to the very restricted space between the inner base of the calyx cup and the outer rim of the button from which the fruit arises. It gains access soon after petal fall. The injury of most importance is the stunting of bud development. A typical symptom is the lopsided, ridged and bumpy appearance of the young fruit. The mite seems to be closely associated with the spreading of *Alternaria* fungus, the cause of various rots.

1473. BOYCE, A. M., AND KORSMEIER, R. B.

634.3-2.654.2

The citrus bud mite, *Eriophyes sheldoni* Ewing.

J. econ. Ent., 1941, 34: 745-56, bibl. 4.

A full description of the citrus bud mite and of the damage caused by it to lemons on the 20,000 acres seriously infested in California. Infestation has also tended to increase in oranges, though the lemon remains much the most seriously affected host. Oil spray (light medium or medium grade petroleum at 1-67 to 2%) affords the best control. Other methods are discussed. Predacious insects and mites found associated with the mite do not appear to be important in reducing or limiting its incidence.

1474. SMITH, H. S. 634.3-2.752-2.96

Biological control of the black scale.

Calif. Citrogr., 1942, 27: 266, 290-1, being

Pap. Riverside Citrus Exp. Stat. 453, bibl. 2.

The parasite, *Metaphycus helvolus*, is proving very effective as a control of black scale of citrus in parts of California. It is characterized by the author as the most remarkable insect parasite with which he has ever worked. It lives for a long period as an adult, over 8 months, and in addition to parasitization destroys a large number of scale insects by feeding on them.

1475. WOGLUM, R. S. 634.3-2.796

The Argentine ant, [*Iridomyrmex humilis*].

Calif. Citrogr., 1942, 27: 155.

The Argentine ant is often a pest in Californian citrus orchards since it is largely instrumental in the spread of mealy bug and various scales. It can be effectively dealt with by poison baiting, especially if large acreages can be treated co-operatively. A formula, of which the basis is sugar, honey and arsenic, known as the United States

government Argentine ant formula, has been very successful, as have 3 proprietary brands which are named. The grower, however, is warned that many of the substitutes marketed are very inferior. Control is best in early spring when the large winter colonies are dispersing and food is less plentiful than in summer. Instructions for baiting are given.

1476. BOYCE, A. M.

634.31-2.78

Control of orange tortrix.

Calif. Citrogr., 1942, 27: 219.

A brief account of the life history of the orange tortrix, *Argyrotaenia citrana*, as it affects control and a discussion of the use of cryolite applied as dust or spray for the purpose. With dust the treatment consists of a 50% cryolite dust mixture applied at the rate of 1 lb. per tree. If the treatment is combined with one of the sulphur dust treatments for thrips a mixture of 40% cryolite, 60% 325-mesh sulphur at the rate of 1½ lb. per tree is advised. If the use of cryolite in spray mixture is considered, 3 lb. of cryolite per 100 gal. should be incorporated in the regular oil sprays used against scale and mites. Cryolite is not compatible with lime-sulphur but may be used with wettable sulphur. Application of cryolite dust during May and early June in California prevents fruit drop in autumn and winter and eliminates largely the scarring by the small tortrix larvae between the buttons of young fruit. Inclusion of cryolite in the summer oil sprays will also give satisfactory treatment against fruit drop.

1477. RUSSO, G.

634.3-2.944

Le fumigazioni cianidriche degli agrumi.

(HCN fumigation of citrus.)

Ital. agric., 1942, 79: 305-16.

After discussing the chemical reactions which take place following the different methods of treating citrus with HCN gas for scale the author considers the amounts of cyanide and the various apparatus necessary for the successful and safe application of the gas. He notes that the operation should not be carried out when the trees are in full growth. He deals also with the fumigation of stacked boxes of fruit.

1478. BARTHOLOMEW, E. T., SINCLAIR, W. B., AND

LINDGREN, D. L.

634.3-2.944

Measurements on hydrocyanic acid absorbed by citrus tissues during fumigation.

Hilgardia, 1942, 14: 373-409.

Some of the factors influencing the absorption and retention of HCN by citrus tissues have been determined by conducting fumigation experiments in a gastight metal fumatorium in the laboratory and in regulation canvas tents in the field. The concentrations of HCN remained nearly constant in the fumatorium but varied greatly in the tents during the fumigation periods. Considerably more HCN was absorbed by fruits preconditioned overnight at 43° F. before fumigation than by those preconditioned at 80°, and green fruits absorbed an average of 5.4 times as much HCN as mature fruits. Under laboratory conditions the absorption of HCN by fruits was retarded by the application of oil spray, but both fruits and leaves sprayed under field conditions absorbed as much HCN as unsprayed fruits and leaves. Less HCN was absorbed by leaves and fruits on trees that had not been recently irrigated than by those on trees that had been recently irrigated, but there was no appreciable difference in the amounts of HCN absorbed by turgid and non-turgid leaves and fruits fumigated in the laboratory. The turgid fruits were more severely injured than the non-turgid. In 1939-40 green fruits from inland areas absorbed less HCN than green fruits from coastal areas; but in the similar experiments in 1940-1 the inland fruits absorbed more HCN than the coastal fruits. The coastal fruits were much more severely injured than the inland fruits both years. Green fruits fixed or chemically changed absorbed HCN so that it could not be recovered and determined by the usual methods. Leaves and fruits of

trees fumigated during the day or at night absorbed approximately the same amounts of HCN, but those fumigated during the day were much more severely injured than those fumigated at night. In these experiments recoverable HCN was retained by mature leaves for at least 60 hours, by green fruits 35 to 40 hours, and by mature fruits 20 to 25 hours. An average of 6.3 times as much HCN was recovered from the green fruits as from the mature fruits. The stomata are apparently not important in governing the rate of entrance of HCN into citrus leaves and fruits. The physiological condition of the tissues rather than environmental influences or the amount of HCN absorbed seems to determine whether they will or will not be injured by HCN after fumigation at night; injury after day fumigation appears to result from the effects of sunlight, which raises the temperature and influences the physiological condition of the tissues.

E.T.B.

1479. FULTON, R. A., BUSBEY, R. L., AND YUST, H. R. 634.3-2.944
The behavior of hydrocyanic acid gas under a fumigation tent.

J. econ. Ent., 1941, 34: 777-83, bibl. 1.

All methods of tent fumigating orange trees were found to result in patches of low concentrations of HCN, especially near the periphery of the tent. The mortality of the scale varied accordingly. A dilution device resulting in better distribution is described. It was successfully tested both for orange and lemon tree tent fumigation.

1480. YARNELL, S. H. 634.3-1.523
Leaf segregation in *Citrus-Poncirus* hybrids.
Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 259-63, bibl. 4.

ROHRBAUGH, P. W. 634.3-2.951
Physiological effects of petroleum oil sprays on citrus.

J. econ. Ent., 1941, 34: 812-5, bibl. 13.

BARTHOLOMEW, E. T., SINCLAIR, W. B., AND LINDGREN, D. L. 634.3-2.944

Factors affecting the absorption and retention of hydrocyanic acid by citrus leaves and fruits.
J. econ. Ent., 1941, 34: 815-21, bibl. 5.

SINCLAIR, W. B., BARTHOLOMEW, E. T., AND EBELING, W. 634.3-2.944+2.951

Comparative effects of oil spray and hydrocyanic acid fumigation on the composition of orange fruits.

J. econ. Ent., 1941, 34: 821-9, bibl. 15.

MUNGER, F. 634.3-2.73
Reactions of the citrus thrips to sugar in poisoned baits.

J. econ. Ent., 1942, 35: 51-3, bibl. 4.

1481. ARNOLD, H. C. 633/635
Agricultural Experiment Station, Salisbury.

Rhod. agric. J., 1942, 39: 167-76.

Annual Report of experiments for the season 1940-1. The crops concerned are maize, sunn hemp for the restoration of soil fertility, sweet potato variety trials, soya beans, velvet bean hybrids and cowpeas.

1482. POPENOE, W. 633/635
La granja "Ruchichoy" en Panajachel.
(Ruchichoy farm in Panajachel.)

Rev. agric., Guatemala, 1942, 19: 83-8.

A note on a small experiment station in Guatemala, founded by Gordon P. Smith in 1930, with the active help of the Technical Service for Agricultural Co-operation, for the introduction and propagation of plants, chiefly of economic importance. The financial crisis of 1932 compelled the Technical Service to withdraw its support and the station has since been managed entirely by the Smith family. The climates and soils of Guatemala are very varied, and success or failure in one locality is no guarantee of similar results

in other parts of the country. The most valuable contributions of the station to Guatemalan horticulture are recorded as follows:—*Citrus*. Large quantities of young trees of Washington Navel orange and Marsh Seedless grapefruit were propagated and distributed, as were citrus varieties hitherto unknown in the country, mainly Meyer lemon and Tahiti and Persian limes. *Avocado*. The Guatemalan avocado is grown chiefly at the higher altitudes. The lowland hybrids introduced from U.S.A. render ripe fruit available almost the year round. *Diospyros kaki*. Numerous varieties of kaki have been tested and are available for distribution, if the fruit could be made popular. *Grapes*. Trials of hybrid *Vitis vinifera* × American varieties were carried out and the particularly successful white variety *Niagara* was extensively distributed. *Peach*. The common peach of Guatemala is a descendant of early European introductions and lacks quality. U.S.A. varieties, the result of crosses between European peaches and the Chinese peach Peen-to, seem more suitable to tropical conditions, while two of these high quality hybrids, Angel and Jewel, grow equally well at high altitudes. They require to be grown on peach stock. *Strawberry*. Missionary has proved the most useful variety. *Eugenia uniflora*. The pitanga or Surinam cherry will succeed from sea level up to 6,000 ft. and its cultivation is being encouraged.

1483. TIMSON, S. D. 631.86

Kraal compost.

Rhod. agric. J., 1942, 39: 161-6.

A simple method of composting by placing crop wastes, grass, etc., under the feet of stock for a time, adding a little soil and wood ashes or agricultural lime and then building these materials into heaps which are subsequently turned over by forking on 3 or 4 occasions.

1484. DAINES, R. H. 633.492-2.3

Sweet potato pox.

Circ. New Jer. agric. Exp. Stat. 438, 1942, pp. 2.

Pox in sweet potato is due to *Actinomyces ipomoea*. This organism only flourishes in alkaline soils. The pH range optimum for sweet potato growth in soils known to be infected is 4.4 to 5.0 and efforts should be made not to vary from this appreciably in either direction. Notes are given on adding sulphur to alkaline soils.

1485. DAINES, R. H. 633.492-2.4

Scurf, black rot and stem rot of sweet potatoes.

Circ. New Jer. agric. Exp. Stat. 437, 1942, pp. 8.

For the control of the scurf, black rot and stem rot fungi of sweet potatoes it is essential that only disease-free sprouts should be set in the field. An organic mercurial 1-8 dip for the seed potatoes is recommended with certain precautions. Sprouts should be treated with a 1-10 dip and it is advised that the sand in the plant beds should be replaced annually by clean sand and the bed scrubbed with formaldehyde or bluestone solution.

1486. REUTHER, W., AND BURROWS, F. W. 633.85-2.19: 546.711

The effect of manganese sulfate on the photosynthetic activity of frenched tung foliage.

Proc. Amer. Soc. hort. Sci. for 1942, 1942, 40: 73-6, bibl. 5.

Although applications of manganese sulphate restored the colour to chlorotic leaves of tung there was strikingly little difference in rate of photosynthesis of affected and healthy leaves under the wide range of light and temperature conditions of a Florida summer.

1487. WEBSTER, C. C. 633.85

Transplanting budded plants of *Aleurites montana*.

E. Afr. agric. J., 1942, 8: 39-41.

Experiments are described from which it appears that budded plants of *Aleurites montana* (tung) can be easily transplanted as stumps. Cutting back the stump to one inch above the bud patch some days before transplanting so that the scion

bud is rendered active will ensure rapid growth. Only inconvenient roots should be shortened.

1488. SHARPE, R. H., AND MERRILL, S., JR. 633.85-1.531

Effect of stratification and time of planting on germination of tung seed.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 286-91, bibl. 3.

Stratification of hulled tung seed in Georgia and Louisiana definitely hastened and improved germination. Stratification of whole fruit was not so successful. Better results were obtained by stratifying at moderately cool temperatures, 40-65° F., than in cold storage at 34° F.

1489. FERNHOLZ, D. L., AND POTTER, G. F. 633.85-2.111

Injury to tung trees by low temperatures occurring in November 1940.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 225-30.

Although severe killing back, bud and twig killing, crotch injury and isolated injury on the trunks resulted to tung trees from the sudden cold spell in November 1940, during which temperatures of 17°, 15°, 19°, 24° and 12° were recorded in different tung orchards, many of the trees made a remarkable recovery in the first growing season afterwards.

1490. FERNHOLZ, D. L., AND HINES, L. 633.85: 581.162.3

Preliminary storage experiments with pollen of tung (*Aleurites fordii* Hemsl.).
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 251-4, bibl. 1.

Trials at Bogalusa, La, show that pollen from buds collected just before anthesis gives the best viability and longevity. It can be kept very satisfactorily at about 5° C. Storage of whole flowers in paper bags at 5° C. in a household refrigerator is a practical method of keeping pollen for future breeding work.

1491. SINCLAIR, W. B., BARTHOLOMEW, E. T., AND BLISS, D. E. 634.62-1.8: 581.192

Composition of dates as affected by soil fertilizer treatments.
A. R. Date Growers' Inst., 1941, 18: 11-6.

Chemical analyses were made on samples of Deglet Noor dates from plots receiving different fertilizers in order to determine the effect of the treatments on the chemical composition of the fruit. Aside from the four control plots, the 10 fertilized plots were supplied with nitrogen in the form of ammonium sulphate. Each palm in 2 plots received 40 lb. of ammonium sulphate annually, and each palm in the other 8 plots received 20 lb. of ammonium sulphate plus 400 lb. of steer manure annually. Of the 8 plots, 4 received annual applications of 30 lb. of potassium sulphate per palm and 4 received 20 lb. of triple superphosphate per palm. Although the fertilizers had influenced the average yield per palm, the differences in chemical composition of the fruit were very small. Fruit quality in terms of commercial grades depends on such properties as size, mass, texture, surface defects, moisture, and sugar content, but of these properties the moisture content is the most important. Since environment and fruit bunch

management are known to play a major role in the determination of fruit quality, it appears that soil fertilizer treatments are relatively unimportant in this regard. [Authors' summary.]

1492. NIXON, R. W., AND CRAWFORD, C. L. 634.62-1.542.27

Quality of Deglet Noor date fruits as influenced by bunch thinning.

Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 103-10, bibl. 2.

Reducing the number of bunches does not suffice to produce the best size and quality of date. In trials at Indio, Calif., reducing the number of fruits per bunch resulted in increased size and generally improved quality of date. Reducing the number of fruits per strand resulted in larger fruits than the same amount of thinning done by removing entire strands. Larger fruits were produced on the outside strands when the inside strands were removed than on the inside strands following the removal of the outside strands.

1493. HALMA, F. F. 634.653-2.111

Leaf sap concentration and cold resistance in the avocado.

Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 231-5, bibl. 5.

Leaf sap concentration studies of eight Avocado varieties covering a period of 2 years revealed no relationship between the osmotic value of expressed leaf sap and cold hardiness. Percentages of total soluble solids, however, were, in most cases, consistently higher for the hardy varieties than for the relatively tender ones.

1494. PICKETT, B. S., AND BROOKS, L. E. 635.1/7

Vegetable adaptability in the Wichita Valley.
Bull. Texas agric. Exp. Stat. 610, 1942, pp. 36,
bibl. 11.

A report of 13 years' work on the adaptability of vegetables to the soils and climate at the Wichita Valley Irrigated Experiment Station, Iowa Park, Texas.

1495. FRIEND, W. H. 635.9(76.4)

Plants of ornamental value for the Rio Grande Valley of Texas.

Bull. Tex. agric. Exp. Stat. 609, 1942, pp. 155.

An interesting catalogue of ornamentals which can be grown successfully in Texas, it supplements two previous bulletins, Nos. 447 and 551, entitled Trees and shrubs of northwest Texas, and Valuable plants native to Texas.

1496. AYLEN, D. 631.459

Conserving soil in the Native Reserves.
Rhod. agric. J., 1942, 39: 152-60.

OPPENHEIMER, H. R. 581.9: 551.453

A contribution to the desert flora south and southwest of the Dead Sea.

Palestine J. Bot. (R), 1940, 3: 144-53, bibl. nil.

For a nearly complete bibliography the reader is referred by Oppenheimer to Dinsmore's 2nd edition of Post's *Flora of Syria, Palestine and Sinai*.

MARSHALL, G. W. 635.1/7

Hints on vegetable growing in Southern Rhodesia.
Rhod. agric. J., 1942, 39: 179-91.

European vegetables.

TROPICAL CROPS.

1497. CASTRO ESQUIVEL, R. 633/635: 551.566.1

Campos experimentales. (Experiment stations in Costa Rica.)

Rev. Dep. nac. Agric. (D.N.A.) Costa Rica, 1941,
6: 5-17.

A brief outline is given of the work and aims of 4 horticultural and agricultural experiment stations in Costa Rica. They are at Birrisito, sugar cane, potatoes, beans; Palmares,

tobacco; Ojo de Agua (newly started); El Porvenir, onions and other plants.

1498. PATERSON, D. D. 631.16

Cultivation costs and labour requirements for crops grown on the College Farm.

Trop. Agriculture Trin., 1942, 19: 104-15.

The cost of raising the crops grown on the farm of the

Imperial College of Tropical Agriculture, Trinidad, is analysed for a period of years. The results obtained are then applied to discover the prospects of success of any attempt to establish smallholders on the land when demand for labour, now very high, diminishes as it is bound to do. The general economy necessary for such holdings is worked out and the conclusion is reached that while the difficulties are not insuperable they are very great and there is no doubt that, whether the holding be relatively large or small, a satisfactory standard of living will not be attained without regular and steady work in the field by all the adult members of the household, a prospect which might not be attractive to the average labouring family. It is a *sine qua non* that only the best possible sites should be selected for the new holdings and that a well-planned system of management should be followed to ensure the maintenance of soil fertility, crop rotation and distribution of labour.

1499. DIJKMAN, M. J. 633/635: 551.566.1
Hoe kunnen wij onze ongecultiveerde concessies productief maken? (How can we profitably use our uncultivated reserve lands?)
Bergcultures, 1941, 15: 1652-66, bibl. 28.

All estates in south Sumatra hold land for future extension which is at present uncultivated. This land might be put to profitable use by growing *Boehmeria* (ramie), *Amorphophallus oncophyllus*, *Aleurites montana* (tung), *Derris elliptica* and *Andropogon zinzanioides*, a grass which produces an essential oil. Cultural methods of all these are fully discussed.

1500. ELMER, L. A. 586.62
Quinoa (*Chenopodium quinoa*).
E. Afr. agric. J., 1942, 8: 21-3.

A nutritious food crop from the Andes, quinoa or Inca wheat (*Chenopodium quinoa*) has recently been acclimatized in Kenya and has already produced 600 lb. of seed per acre. It is the only small grain crop that will withstand the ravages of the local birds. In Peru it grows at elevations up to 12,000 ft., being resistant to drought, frost, and very tolerant as to soil. Its behaviour in several districts of Kenya is discussed and the conclusion is reached that it should succeed in East Africa at altitudes of 6,000 ft. and over, assuming 15 to 25 inches of rain during the growing period and a dry harvesting season. It should be ready 4½-6 months after sowing. By using the plant as a green manure 100% increase in yield of potato was secured.

1501. TABOR, P. 631.874: 631.459
Observations of kudzu, *Pueraria thunbergiana* Benth, seedlings.
J. Amer. Soc. Agron., 1942, 34: 500-1.

Kudzu seedlings have advantages over crowns, i.e. plants developed naturally from noded roots, since they can be produced in one growing season, give a higher yield per acre and are easier to handle in transport and transplanting. In raising seedlings narrow rows and thick sowing should produce 100,000 seedlings per acre. The sowing rate advised is 25 seeds per linear foot. The correct width between rows is not mentioned but 3 feet is considered wide. Shallow sowing, ¼-½ inch in depth, is necessary since the hypocotyl is more limited in power to elongate than that of most field crops. Seedlings are not frost hardy and require a monthly mean air temperature of 65°-75°. A saturated soil is fatal, roots will die below the level of a temporary water table in 1 to 3 days. Seedlings until the development of the 6th true leaf are easily injured by mechanical cultivation or soluble commercial fertilizers. Under favourable growth conditions seedlings are transplantable after 30 days when one or more roots are at least ¾ in. in diameter and 6 inches long. Sufficient root size is essential to survival of transplants. Early planting encourages heavy vine growth. Clipping the seedling vines before lifting has seriously injured their cold resistance and keeping quality. Cessation of growth and partial drying

is necessary before lifting begins. Uninjured seedlings can be kept after lifting till required by heeling in on well drained land. [Kudzu is now used in parts of U.S.A. and elsewhere as an anti-erosion cover.]

1502. CROSS, W. E. 633.61
Las cañas Tucumanas de semillero, resultados obtenidos en los últimos años. (Nursery trials of Tucuman canes, results obtained in recent years.)

Rev. Industr. Agric. Tucumán, 1941, 31: 119-268.

A comprehensive report on the behaviour of many varieties of canes grown in the nursery of the Tucuman Experiment Station from seed derived from various sources. J.W.G.

1503. PICKLES, A. 633.61-2.753
A discussion of researches on the sugar-cane frog hopper (*Homop.*, *Cercopidae*).
Trop. Agriculture, Trinidad, 1942, 19: 116-23, bibl. 44.

Summarizes the results (or lack of them) obtained by a train of investigators since 1899 to the present day on this most serious pest of sugar-cane in Trinidad (*Tomaspis saccharina*). The author, who has worked on the problem since 1929, considers that dusting the spittle masses concentrated on the surface of the soil around the base of the cane with Cyanogas during nymphal emergence followed later when necessary by dusting with pyrethrum to destroy the adults presents the most hopeful policy and that the method though now arduous, can be made easier of application and more constant in results.

1504. SCHOOREL, A. F., AND ASMAN, M. C. 633.72-1.541
Vegetatieve vermeerdering bij thee. (Vegetative propagation of tea.)
Bergcultures, 1941, 15: 1667-73.

A well illustrated description of the vegetative propagation of tea by the Forkert budding and veneer grafting methods.

1505. DE HAAN, I. 633.72-1.541.11
De ontwikkeling en de vertakking van oculaties bij thee in verband met de eigenschappen van het oculatiehout en den onderstam. (Development and branching of tea buddings in relation to the characteristics of scion and stock.)
Bergcultures, 1941, 15: 1623-8, bibl. 2.

Rootstock trials of budded tea on thick stocks (over 20 mm diameter at 10 cm. above ground) and thin stocks (15 mm diameter or less) indicated that with both clonal and unselected budwood buds placed on thick stocks would produce 3 or 4 shoots from the bud shield while those on the thin stocks produced only one. In the matter of after growth clonal scions gave many more side shoots and thus a higher yield than scions from unselected plants, irrespective of the type of stock on which they were budded.

1506. MAYNE, W. W. 633.73
The agricultural problem of South Indian coffee.
Plant. Chron., 1942, 37: 190-5, 204-8, 228-32, 244-7, 266-9, 294-7, bibl. 23.

An analysis of some of the agricultural problems connected with coffee growing in South India. Causes of low average yield are attributed to unsuitable location, soil impoverishment, plant deterioration or faulty agricultural methods or to a combination of these factors. Each of these questions is discussed in detail and the author's suggestions, not always in accordance with common belief, are amply supported by experimental results and long experience.

1507. RAYNER, R. W. 633.73: 581.145
Some abnormalities of the coffee bean.
Mon. Bull. Coffee Bd Kenya, 1942, 7: 32, 33, 36.

The abnormalities discussed are *Antestia* damage, black bean, non-discoloured light-weight beans, beans with faulty fertilization, primrose-coloured beans.

508. GILLET, S. 633.73-2.19
Results and observations of spraying trials using bordeaux mixture on coffee at the Scott Agricultural Laboratories.
Mon. Bull. Coffee Bd Kenya, 1942, 7: 30-1.
severe physiologic form of coffee leaf fall in Kenya of unknown origin can be controlled by application of bordeaux mixture, with the result that yields are improved. The effect of the spray is thought to be due to the tonic action of a copper intake through the leaves. Results of experiments are given. There is evidence that a 2% mixture, using twice the quantity of spray per tree, gives better results than a 4% mixture. The optimum dates lie between March and the second week in June. Spraying before or after is ineffective. The criticism that the quality of the coffee is impaired is shown to be unfounded.
509. LE PELLEY, R. H. 633.73-2.754
The food and feeding habits of *Antestia* in Kenya.
Bull. ent. Res., 1942, 33: 71-89, bibl. 24.
It is shown that the *Antestia* bug will feed on any part of the coffee tree though it cannot be brought to maturity on red berries or leaves alone. The damage is more extensive and severe than any single writer has recorded. Even a few *Antestia* can cause an appreciable loss because of inoculation with a berry-destroying fungus. Although the presence of 4 *Antestia* per tree is usually the maximum allowed, the loss at this figure is not negligible and it would often pay to control them at a lower figure. On a research station a maximum of one bug per tree is regarded as the limit. Large green berry food is essential to normal life and reproduction, a fact of importance, since this does give the semblance of a breeding season. The large populations which will be present when the berry is ripe if not previously checked, will do little harm at that time since they feed on the berry pulp. The damage will occur when the crop is removed and heavy feeding occurs on the new shoots. The cropping capacity of the tree may be destroyed for more than one season. In connexion with the necessity of the large green berry for reproduction it is clear that intermittent flowering is a disadvantage since it enables the life cycle to be maintained without a break. Cultivation practices, therefore, from this point of view should aim at securing a single heavy flowering. The dropping of young green berries after attack is not due to injury inflicted on the stalk, which in fact may not have occurred, but is a response of the plant to an interruption of normal growth due to insect feeding. Confirmation was obtained that abnormalities such as multiple branching are a result of the feeding of *Antestia*.
510. LE P., R. 632.754: 633.73
Antestia control.
Mon. Bull. Coffee Bd Kenya, 1942, 7: 29.
Charcoal powder may be used as a cheap diluent for pyrethrum powder in dusting for *Antestia* on coffee. The maximum dilution should be one part of charcoal to one of pyrethrum. Even so there will be some reduction in kill. Diatomite, of which there are large deposits in the country, may be used in the proportion of 3 to 1 of pyrethrum. Routine testing for *Antestia* should never be omitted and early dusting should prevent the development of heavy attacks.
511. LE P., R. 633.73-2.752
Mealy-bug.
Mon. Bull. Coffee Bd Kenya, 1942, 7: 29.
It is urged that at least a few trees on coffee estates in Kenya, where mealy bug is prevalent, should be banded in order to keep ants from ascending and so allow the parasites, *Anagyrus* spp., which are now becoming well established, to breed unmolested and thus increase the number available on the estate. Heavily infested trees should be selected for banding.
1512. PROEFSTATIONS DER CENTRALE PROEFSTATIONS VEREENIGING [JAVA]. 633.912
Aanbevelen Hevea-plantmateriaal 1941-1942. (Recommended Hevea clones 1941-2.)
Bergcultures, 1941, 15: 1692-1709.
The characteristics of a number of Hevea clones under observation at various research stations in Java are discussed.
1513. OSTENDORF, F. W. 633.912: 581.165.1: 575.42(92)
Resultaten van toetstuijn 1930 (Proeftuin Tjomas) tot en met het zevende tapijaar. (Results from the trial plantation (Tjomas experimental plantation) up to and including the 7th tapping year.)
Bergcultures, 1941, 15: 1630-7.
A continued record of performance of various rubber clones.
1514. LOOMIS, H. F. 633.912-1.532
Methods of splitting Hevea seedlings.
J. agric. Res., 1942, 65: 97-124, bibl. 2.
Tests made of the Ramaer and Gambar methods confirmed the opinion of other investigators that the latter method gives better results. In the Ramaer method the young Hevea seedlings are split into two more or less equal parts by a vertical cut passing through the main stem sprout and taproot and between the cotyledon petioles. Thus each section remains attached to the seed by one of the cotyledon petioles. In the Gambar method (described by Zweede, H.A., 11: 213) the vertical cut enters obliquely slightly above the axil formed by one of the cotyledon petioles with the main stem and proceeds downwards as before. The result is two unequal sections each attached to a cotyledon petiole. A third method mentioned as tried by Lammers but less successfully than either of the above (H.A., 11: 1403) splits the seedling into three. It was found that after splitting, the young seedlings under the Gambar method are dependent on the cotyledons for about 2 weeks. Other modifications were devised and tested by the author and described but none was quite as successful as regards the percentage of plants raised as the Gambar method. Both Zweede and Lammers wrote in Dutch and it appears that the present investigations are the first to be fully reported in English. A number of excellent photographs of various stages of both the Ramaer and Gambar methods are provided.
1515. DIRECCION GENERAL DE AGRICULTURA, GUATEMALA 634.573
Cultivo del marañón. (Cultivation of the cashew nut.)
Rev. agric. Guatemala, 1942, 19: 61-2.
Some cultural hints on the cashew (*Anacardium occidentale*) are given. The seeds are sown 12 cm. deep and far enough apart to allow of normal development. Seed boxes should not be used. Final planting distance is 9-12 m. or 16 m. on very favourable sites. Watering and manuring is usually dispensed with but experiments have shown that a little manure will increase fruitfulness. The fruit is gathered with the aid of hooked sticks before it is fully ripe. The tree is not in full bearing till 10 years old but may begin to bear at 18 months. The usual annual yield of nuts per grown tree is 20 lb. though trees have been known to yield up to 100 lb. The yield of kernel is 25% to 30% of the nut. Some notes on local methods of preparation for market are given and figures of the annual imports from all sources of U.S.A.
1516. WIEHE, P. O. 634.61: 581.41
Quelques anomalies du cocotier. (Some abnormalities of the coconut palm.)
Rev. agric. Maurice, 1942, 21: 129-31, bibl. 6.
Branched coconut. A palm 15 ft. high on the atoll of Pêros Banhos, Grand Coquillage Island, has branched into 3 normal heads 4 feet above the ground. It has not

yet flowered. The cause may be due to a disequilibrium of the growth hormones set up by insect punctures. The growth seems to differ from that of true dichotomy, a true case of this on Diamant Island in the same atoll being described. *Spiral trunk*. A coconut palm 45 feet high, of which the upper part of the trunk describes a spiral of 4 turns, is growing in a closely planted grove at Pointe Noroit, Diego Garcia. All the surrounding trees are normal and the manner of growth is probably inherent in the tree. Nuts are to be planted with a view to studying the growth of the progeny. *Suckering at the crown*. On Boddam Island in the Salomon atoll is a palm producing leafy suckers 1 to 2 feet long in place of the inflorescence. Attempts to root these suckers have failed.

1517. NIGHTINGALE, G. T. 634.774: 581.192
Nitrate and carbohydrate reserves in relation
to nitrogen nutrition of pineapple.
Bot. Gaz., 1942, 103: 409-56, bibl. 33.

Methods are given for obtaining in the field quantitative records of plant weight, number and dimensions of leaves and percentage deficiency, if any, of stored water in the leaf of the pineapple plant. Results of the present study emphasize the necessity for maintaining an adequate reserve of nitrate in the plant. If the concentration of nitrate is relatively low, even though measurable amounts are present, its reduction is not so efficiently or freely effected as when it

is higher. Sufficient carbohydrates must be available for oxidation as nitrate is reduced. The effects of differences in temperature on absorption of nitrates and of varying the nitrate reserves on development generally are discussed.

1518. THOMAS, R. 631.459
Soil deterioration in the Belgian Congo, the
necessity for soil conservation and the possibility
of soil reclamation work.)
*Int. Rev. Agric. Rome (Mon. Bull. agric. Sci.
Pract.)*, 1942, 33: 133T-65T, bibl. 31.
FRANSSEN, C. J. H., LEVERT, P., AND VAN
DUYVENDIJK, J. A. 633.513-2.78
Over biologie en bestrijding van den randoe-
kolfboorder (*Mudaria variabilis* RPKE). (Bio-
logy and control of the kapok pod borer.)
Bergcultures, 1941, 15: 1728-43, bibl. 13.
CARTER, W. 634.774-2.752
The geographical description of mealy bug wilt
with notes on some other insect pests of pineapple.
J. econ. Ent., 1942, 35: 10-5, bibl. 10.
VAN DER VEEN, R. 633.912-2.754
Een nieuwe beschadiging aan *Hevea* door
wantsen. (Recent injury to *Hevea* by the
hemipteron *Nysius* sp. (near *N. inconspicuus*).)
Bergcultures, 1941, 15: 1764-5.

STORAGE.

1519. FISHER, D. V. 664.85.11
Mealiness and quality in Delicious apples as
affected by certain orchard conditions and
storage techniques.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 128-32.

Results of work at Ames, Iowa, and Summerland, B.C., are reported. Generally speaking fruit harvested mature had characteristic Delicious flavour, but was susceptible to mealiness, while that harvested immature was sweet, insipid and lacking in characteristic varietal flavour, but much less mealy. As regards storage, at 30-32° F., the best temperature for Delicious, results showed that storage life to maintain optimum eating quality was not greater than 16 weeks. Delay in storage shortened storage life. Controlled atmospheres were also tried, the most favourable being that which consisted in 2-5% O₂ and 97-5 N₂ at 32 or 40° F., a treatment which resulted in considerable lengthening of storage life. Waxing delayed development of mealiness, improved storage life, but resulted in the appearance of a peculiar type of skin scald.

1520. PLAGGE, H. H., AND FISHER, D. V. 664.85.11: 581.192
Pectic changes in Jonathan apples as a measure
of ripening under differential carbon dioxide
treatments.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 169-71, bibl. 5.

The results of the investigations here described indicate that the storage of Jonathan apples in four carbon dioxide concentrations retarded the hydrolysis of protopectin to soluble pectin. The soluble pectin content varied proportionately with the carbon dioxide concentration and with storage temperatures of 32° F. and 36° F. [From authors' summary.]

1521. ISAAC, W. E. 664.85.11.037: 632.19
The incidence of superficial scalds in apples grown
in South Africa in relation to storage tempera-
tures.
J. Pomol., 1942, 20: 12-23, bibl. 23.

Apple storage tests were carried out at the Low Temperature Research Laboratory, Capetown, at different temperatures

and the superficial scald present on the fruits at the end of a week, after removal from store, during which they were kept in a dark room at 18-3° or 20° C. with continuous air circulation, was determined. Two types of scald are distinguished:—(a) *Superficial scald*, tending to develop late in storage at relatively high temperatures (3-3° C. and 7-2° C.) and seen in the varieties Ohenimuri, Granny Smith and White Winter Pearmain. It approximates most closely to the scald, apple scald and superficial scald of earlier literature, but the term as here applied includes discolorations, not always included by other workers. (b) *Frigescence superficial scald* developed chiefly at lower temperatures (—1-7° C. to 0° C.) and was well seen in the varieties Red Delicious, Granny Smith and Wemmershoek. The two last-named showed increased prevalence and intensity of the condition with decrease in temperature, the first showed a maximum of both at 0° C. In Rome Beauty the character of the scald varied considerably and did not readily fall within the scope of either of the above two types. It was very prevalent at all storage temperatures, that of optimum development varying with the season. On the whole it was more severe at higher than at low temperatures and the spotted form of it was certainly more characteristic at the higher ones. It is suggested that in this variety the scald is affected by pre-storage conditions to a greater extent than in the other varieties studied. The relationship of spotted superficial scald to Jonathan spot is discussed, as is also that of frigescence superficial scald to soft scald (which may be a form of it) and to the internal browning of Yellow Newtown apples. [From author's summary.]

1522. WALLS, L. P. 547.313.2: 664.85.11
The nature of the volatile products from apples.
J. Pomol., 1942, 20: 59-67.

In experiments at Cambridge it has been found that, whereas concentrated sulphuric acid will not absorb apple volatile products completely, an acid activated by the addition of silver sulphate is strikingly effective. The almost complete absorption thus made possible offers a means of estimating the total volatile products in terms of CO₂. The processes are described and from the results of their application it is concluded that ethylene forms a high

proportion of the total volatile substances produced by the apple over a long period of its storage life, irrespective of whether it is a variety which yields much or little ethylene. Confirmation is given of the production of other volatiles by the separation from several adsorbents of a variety of odorous substances, among them esters of amyl alcohol with formic and acetic acids.

1523. SMOCK, R. M. 664.85.11
The influence of one lot of apple fruits on another.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 187-92, bibl. 6.

In work at Ithaca, N.Y., the emanations of ripe apples markedly stimulated the respiration rate of pre-climacteric Duchess, Wealthy and McIntosh apples. In one case the ripe apples were of the same variety as that being tested. Definite ethylene injury was apparent as a result of passing the vapors from ripe Yellow Transparent apples over pre-climacteric Wealthy fruits. The emanations of ripe McIntosh apples had no effect on the respiration of post-climacteric Yellow Newtown fruits. *Penicillium expansum* did not seem to generate sufficient ethylene to stimulate the ripening of Duchess or Wealthy apples. [Author's summary.]

1524. ALLEN, F. W. 664.85.11.035.1
Carbon dioxide storage for Yellow Newtown apples.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 193-200, bibl. 5.

Accounts are given of the following experiments:—(1) the storage in glass containers of Yellow Newtown apples at temperatures of 32, 36, 40 and 45° F. in a number of different gas (CO₂) mixtures. (2) Commercial gas storage of Yellow Newtown apples and comparative results with air-stored fruit. (3) Pre-storage treatments with CO₂.

1525. HANSEN, E. 664.85.13
Quantitative study of ethylene production in relation to respiration of pears.
Bot. Gaz., 1942, 103: 543-58, bibl. 27, being
Contr. Hull bot. Lab. 538.

1. A quantitative study of ethylene production in relation to the respiration of pears has been made. The emanation of ethylene in air at 20° C., as well as at higher and lower temperatures in modified atmospheres, has been studied. 2. In fruit in air at 20° C. the rate of ethylene production increases during the climacteric rise in respiration, reaches a peak at the respiratory climax, then declines during the post-climacteric period. During the climacteric rise, ethylene production increases seven- to eighty-fold, while rate of respiration approximately doubles. 3. Each variety was found to have a characteristic maximum rate of production. The maximum rate for Bartlett, a variety which maintains its capacity to ripen for only a short period of time when kept at a storage temperature of 0° C., is 3-25-4-48 ml. per kg.-day. The maximum rate for Anjou, a variety which maintains its capacity to ripen for a long period of time when kept at cold storage temperatures, is 0-57-0-78 ml. per kg.-day. The maximum rate of respiration for Bartlett is approximately double that for Anjou. 4. Under anaerobic conditions the production of ethylene is either greatly retarded or entirely inhibited. In the fruits used for these experiments there was found but little difference in the production of CO₂ under aerobic and anaerobic conditions. 5. The maximum rate of ethylene production occurs at 20° C. At higher temperatures production decreases and is totally inhibited at 40° C. Respiratory activity as measured by either CO₂ production or O₂ consumption is greatly accelerated between 20° and 40° C. [Author's summary.]

1526. ENGLISH, H., AND GERHARDT, F. 664.85.23.035.1
Effect of carbon dioxide and temperature on the decay of sweet cherries under simulated transit conditions.
Proc. Amer. Soc. hort. Sci. for 1942, 1942,
40: 172-6, bibl. 4.

Trials showed that as regards brown rot in sweet cherries air storage at 31° F. was superior to 20% CO₂ storage at 45° F. but slightly inferior to 20% CO₂ storage at 36° F. Results suggest that if the temperature could be maintained at about 31° F. the decay of sweet cherries in transit from Pacific Coast States to Eastern markets could be effectively controlled without the addition of CO₂.

1527. MINZ, G. 664.85.31: 632.4: 535.21
Early diagnosis of Jaffa orange blemishes and diseases by means of ultra-violet rays.
Palestine J. Bot. (R), 1940, 3: 259-62, bibl. 2.

The hope that it might be possible to discover mould (*Penicillium*) or stem end rot (*Diplodia* sp.) in oranges before packing by means of ultra-violet rays has not been fulfilled since such rays are found incapable of detecting these diseases during their incubation period in the fruit. Ultra-violet rays will, however, show up such mechanical blemishes as pox or hail spots.

1528. JONES, W. W. 664.85.651.037
Respiration and chemical changes of the papaya fruit in relation to temperature.
Plant Physiol., 1942, 17: 481-6, bibl. 13.

1. Papaya fruit are "chilled" [i.e. so affected that they will not ripen properly afterwards] when stored for a period of 5 days at a temperature of 45° F. or lower. 2. The temperature coefficient was found to be 1-5 between 40° and 45° F., 3-3 between 45° and 50° F., 2-2 between 50° and 55° F., and 2-2 between 55° and 60° F. 3. Ripening changes, especially sucrose changes, are retarded by all temperatures studied. 4. It is suggested that there is a difference between the basic metabolism of tropical climate and temperate climate fruit. 5. In the transport and marketing of papaya the temperature should not be allowed to go below 50° F. [Author's summary.]

1529. DENNY, F. E. 664.85.037: 577.15.04
Inactivation of the browning system in frozen-stored fruit tissue.
Contr. Boyce Thompson Inst., 1942, 12: 308-20, bibl. 1.

Tissue of the fruits of peaches, pears and apples, after having been peeled, cored, or pitted, was dipped in dilute solutions of thiourea, NH₂CSNH₂ (also called thiocarbamide), previous to freezing in a cold room at -6° to -10° C. The tissue so frozen was stored for many months or even for more than a year without the occurrence of browning. A dipping solution of 0-1% thiourea sufficed for peaches and pears and one of 0-2% for apples. Fruit tissue so dipped and frozen did not turn brown when thawed and exposed to air, nor after it had been thoroughly leached with water during a period of 20 to 24 hours (to remove the absorbed thiourea). The treatment had rendered the tissue incapable of turning brown on exposure to air. Only a short period of storage of the treated tissue in the frozen condition was needed to inactivate the browning system. For peach tissue dipped into 0-1% thiourea the time required for inactivation was one to two days, for pear tissue it was two to four days, and for apple tissue dipped into 0-2% thiourea it was about ten days. A method was developed for obtaining and holding apple tissue in the frozen condition without the occurrence of browning, and without treating it with thiourea. Such tissue browned rapidly upon thawing and exposure to air, while tissue handled in the same manner except that it was treated with thiourea did not turn brown.

even when leached with water. This showed that the conditions during the freezing period were not such as to cause inactivation of the browning system in the absence of thiourea, and indicates that thiourea by its presence brings about the loss of the capacity of the tissue to turn brown. [Author's summary.]

1530. GERHARDT, F. 664.85+664.84
Simultaneous measurement of carbon dioxide and organic volatiles in the internal atmosphere of fruits and vegetables.
J. agric. Res., 1942, 64: 207-19, bibl. 16.

A method and an apparatus have been described for the simultaneous measurement of carbon dioxide and total volatiles in the internal atmosphere of fruits and vegetables. These analyses can be made simultaneously from the same sample of plant tissue. The method involves (1) extraction of the internal atmospheres by refluxing and aspirating the plant tissue in boiling distilled water for 2 hours in an air stream of CO_2 -free air at 20 liters per hour; absorption of the components of the internal atmosphere in two gas scrubbers in series, the first bearing activated sulfuric acid for the removal of organic volatiles and the second bearing standard alkali for the removal of carbon dioxide; and (3) the oxidation of the organic absorbates with ceric sulfate. Applications of the method include studies of (1) the adsorptive capacity of oiled fruit wraps for volatile emanations; (2) the influence of storage temperature, ripening processes and soft scald on the composition of the internal atmosphere of fruits; and (3) comparative analyses of the internal atmosphere of certain vegetables and deciduous fruits. [Author's summary.]

1531. KESSLER, H. 664.84.34
Der luftgekühlte Erdkeller, ein neuzeitlicher Kellertyp zur Aufbewahrung von Kohlgemüse. (An air-cooled store for cabbages.) [French summary 17 l.]
Landw. Jb. Schweiz, 1942, 56: 344-56, bibl. 1.

An illustrated account of an air-ventilated storage building in which it was found possible to store cabbage very successfully during the winter months at Wädenswil in Switzerland. The building is partly sunk in the earth and is provided with tubes connecting with the outer air on both sides and discharging cold air at floor level inside the building just below the slatted floor on which the cabbages lie. Centrally placed and opposite each pair of inlet tubes is a high chimney for the escape of the warm air, the total diameter of the inlet holes being as 2:1 compared with the outlet chimney. The whole building is thoroughly well insulated against changes in outside temperature. Results compared with those from artificially cooled stores and ordinary concrete stores have been extremely satisfactory. A graph shows the striking degree of uniformity in temperature achieved in the store during the months of December to mid-March as compared with that outside.

1532. LEMKE, M. 664.84
Untersuchungen über die Qualität von Mieten-gemüsen. (Investigations on the quality of stored vegetables.)
Gartenbauwiss., 1941, 16: 129-35, from abstract
Forschungsdienst, 1942, Vol. 13, abstr. p. 91.

Tests of vitamin content of carrots, celery and white cabbage before and after storage are reported. Carrots. These showed a slight decrease in dry matter, a large fall in sugar and a not insignificant rise in carotin and vitamin C. Celery. Whatever the type of store vitamin C fell considerably. Dry matter fell slightly in cellar storage and considerably in clamp storage. Cabbage. Methods used were wrapping with heads pointing up and heads pointing down, clamping ditto, heaping with and without a layer of sand. In the first two methods of preservation when stored the right way up cabbages showed decreased vitamin C content, whereas if stored upside down or merely heaped

their vitamin C content of fresh weight rose appreciably, the stalk showing the highest values.

1533. DENNY, F. E., AND THORNTON, N. C. 664.84.21.035.1
Interrelationship of storage temperature, concentration and time in the effect of carbon dioxide upon the sugar content of potato tubers.
Contr. Boyce Thompson Inst., 1942, 12: 361-73, bibl. 6.

The effects on sugar and sucrose content of the juice of storing potato tubers at 2°, 5° and 7° C. in atmospheres containing 0, 5 and 20% CO_2 and 21% O_2 are noted.

1534. DENNY, F. E., GUTHRIE, J. D., AND THORNTON, N. C. 664.84.21.035.1: 577.15.04
Effect of the vapor of the methyl ester of α -naphthaleneacetic acid on the sprouting and the sugar content of potato tubers.
Contr. Boyce Thompson Inst., 1942, 12: 253-68, bibl. 4.

Incorporating filter papers impregnated with the methyl ester of α -naphthaleneacetic acid among potatoes stored in glazed earthenware containers at the rate of 400 mg. of the chemical per kg. of tubers inhibited sprouting completely for at least a year when the temperature was kept at 10° C. and at this temperature no shrinkage occurred. At 15° C. sprouting was inhibited for 8 months, but there was some shrinking due to loss of moisture. At 18° C. and at 23° C. sprouting was inhibited for from 3 to 6 months, but shriveling occurred. No definite effect of the treatment could be established on the sugar content. Whatever changes occurred were small. Such treatment cannot be recommended as a preliminary to potato chip manufacture for lack of information as to the toxicity of the chemical.

1535. DAVIES, R. O. 664.84: 275.16
Some observations on carotene losses in storage.
Chemistry and Industry, 1942, 61: 275-6.

Concerns the storage of dried green meals, i.e. lucerne and pasture grasses and the conditions necessary to ensure the maximum possible retention of carotene.

1536. DIEMAIR, W. 664.8
Die Haltbarmachung von Lebensmitteln. (The preservation of foodstuffs.)
Ferdinand Enke, Stuttgart, 1941, pp. 547, illustrations 137, RM. 37.50. Reviewed *Forschungsdienst*, 1942, Vol. 13, abstr. p. 94.
PAECH, K., AND LOESER, E. 664.84/85.037+663.813

Die Gefrierkonservierung von Gemüse, Obst und Fruchtsäften. I. Hälfte: Die biologischen Grundlagen und die Herstellung der Gefrierkonserven in der Praxis. (Preservation by freezing of vegetables, fruit and their extracted juices. Part I. The biological basis of such processes and the production of cold stored goods in practice.)

Paul Parey, Berlin, 1941, pp. 176, RM. 12, reviewed [very favourably] *Forschungsdienst*, 1942, Vol. 13, abstr. p. 78.

WINTER, J. D. 664.85.037
Preparing fruits and vegetables for the frozen food locker.
Minn. Hort., 1942, 70: 103-5.

SCHMIDT, L., AND OTT, M. 581.192: 634/635
Methoden zur chemisch-biologischen Qualitätsbestimmung von gärtnerischen und landwirtschaftlichen Erzeugnissen. (Chemical and biological methods of determining quality in horticultural and agricultural products.)
Neumann, Neudamm and Berlin, 1941, pp. xii+60, RM. 9.50, reviewed in *Forschungsdienst*, 1942, Vol. 13, abstr. p. 38.

PROCESSING AND PLANT PRODUCTS.

1537. MRAK, E. M., FISHER, C. D., AND BORNSTEIN, B. 664.85.047

The effect of certain substances and pretreatments on the retention of color and sulphur dioxide by dried cut fruits.

Fruit Prod. J., 1942, 21: 297-9, bibl. 4.

The best results were obtained, using Royal apricots, when the fruit, before or after cutting but prior to sulphuring, was dipped for 5 minutes in a 5% sodium citrate solution. Although about 50% of the sulphur dioxide had disappeared in 6 months the colour of the fruit remained good. Results obtained with dips of sodium bicarbonate, sodium carbonate, calcium carbonate, tri-sodium phosphate, calcium hydroxide, sodium tartrate, citric acid and tartaric acid solutions were not satisfactory. When whole fruits were washed for 30 seconds in a solution containing 5% sodium citrate colour retention was good, but when washed for 5 minutes it was bad probably because excessive leaching takes place in the longer dips together with a breaking down of surface structure which results in poor appearance. Dipping or spraying with solution of sodium sulphite increased SO_2 retention but failed to improve colour retention. Sugar added to the cups of the fruit had the reverse effect. The commercial practice in California of spraying the fruit with water before sulphuring is found to be useless though by actually immersing the fruit a slightly increased retention of SO_2 is obtained.

1538. BROWN, W. B., AND HIGGINS, A. E. H. 664.85.047: 632.7

The control of insects infesting dried fruits.

Publ. (out of series) Dep. sci. industr. Res. Lond., 1942, pp. 23, bibl. 4, 6d.

After preliminary notes as to the chief pests likely to cause trouble in dried fruit, namely *Ephestia elutella*, *Plodia interpunctella*, *Silvanus surinamensis*, *Ptinus tectus*, *Niptus hololeucus*, and hints on how to clean warehouses and keep them clean, the authors describe in considerable detail the process of fumigation by means of a mixture of ethylene oxide and carbon dioxide, stressing the fact that such fumigation, to be both effective and safe, needs great care in its application. In addition notes are given of spraying to kill the moths when they emerge, the insecticide recommended for this being a solution of pyrethrum in a white mineral oil.

1539. REED, W. D., AND VINZANT, J. P. 633.71-1.56-2.7
Control of insects attacking stored tobacco and tobacco products.

Circ. U.S. Dep. Agric. 635, 1942, pp. 41.

An account is given of the detail of control of manufactured tobacco pests and of tobacco products both in open and closed warehouses, of control by chamber fumigation, and of control in tobacco factories. The most serious pests are the cigarette beetle (*Lasioderma serricorne*) and the tobacco moth (*Ephestia elutella*) and methods employed include pyrethrum dusting and fumigation with HCN and CS_2 and the screening of warehouses.

1540. CROSBIE-WALSH, T. 664.84.047

The birth of British vegetable dehydration.

Food Manuf., 1942, 17: 217-8.

Describes a visit to one of the Ministry of Food's pilot dehydration plants. Details are given of some of the processes and of the manner of preparing the finished products for the table.

1541. CRUESS, W. V., AND MRAK, E. M. 664.84.047

The dehydration of vegetables.

Fruit Prod. J., 1942, 21: 201-4, bibl. 13; 241-2, bibl. 1; 269-72, bibl. 5; 302-7, bibl. 7; 337-40, bibl. 6.

A comprehensive account of the most suitable methods of dehydration of various kinds of vegetable including

important advances in technique which have occurred too recently for inclusion in previous publications.

1542. ADAM, W. B., HORNER, G., AND STANWORTH, J. 635.1/7: 631.56

Changes occurring during the blanching of vegetables.

J. Soc. chem. Ind., 1942, 61: 96-9, bibl. 5.

The effects of blanching a representative range of English vegetables for 1, 3 and 6 minutes in water and for 3 minutes in steam have been recorded, the factors studied being the retention of the chief nutritive substances and the principal physical changes. Small units of large surface area retain 65-81% of their sugars, 70-83% of their mineral substances, 78-86% of their protein, 50-68% of their vitamin C; the larger roots and starchy seeds retain 79-90% of their sugars, 84-92% of their mineral substances, 92-98% of their protein and 67-78% of their vitamin C. In general, blanching improves flavour and texture, reduces weight and volume. In canning it enables a greater weight of vegetables to be filled in the cans and has an appreciable effect on the pressures developing in them. All desirable effects are produced in the first two minutes of blanching and short blanching times are essential if nutritive elements are to be preserved. [From authors' summary.]

1543. MARSH, G. L., AND CRUESS, W. V. 664.84.31.036.5

Experiments with asparagus butts.

Fruit Prod. J., 1942, 21: 333-6, 344, bibl. 3.

In canning asparagus in California about 40% of the butt is cut off and discarded to an annual total of approximately 20,000 tons. Air-dried asparagus butts have been shown to have the over-all feeding value of good oat hay and to approach alfalfa hay in feeding content. They contain considerable nitrogen and therefore have a fertilizing value. The juice expressed and treated by a method which is described forms an excellent medium in which to can asparagus stalks, imparting a superior flavour to the product. Concentrates of the juice are high in nitrogen, alkaline ash and in potassium and calcium salts, though low in vitamins B₁ and G. Thus they may have some therapeutic value or be useful in livestock feeds. Acidified pasteurized juice treated to eliminate the "kraut" flavour could be used as a "health beverage". [From authors' summary.]

1544. CHARRIÈRE, J. 664.84+664.85

La conservation des fruits et des légumes.

(Preservation of fruits and vegetables.)

Rev. hort. Suisse, 1942, 15: 167-9.

Brief clear accounts of how to preserve vegetables and fruits in the home by the following methods:—(1) Cooking and bottling fruit in airtight, spring-closed bottles without sterilization. (2) Sterilizing and bottling fruit and vegetables. (3) Apple juice manufacture. (4) Drying vegetables. (5) Storing vegetables in salt or vinegar.

1545. HODGES, F. A. 664.85.035.5

Detection of foreign fruit tissues in jams and preserves.

Canad. Food Packer, 1942, 13: 7: 23.

Many samples of jams and preserves contain added foreign fruit tissues, principally apple, in addition to the fruit represented by the name on the label. An easy method of detecting such adulteration is described.

1546. PEYER, E. 634.8: 633.85

Die resultate der ersten Verarbeitungskampagne zur Gewinnung von schweizerischen Traubenkernöl. (Results of the first campaign for the extraction of grape pip oil.)

Schweiz. Z. Obst-und Weinb., 1942, 51: 269-70.

The cost of extraction of oil from grape pips is high and the returns in oil are low. The oil is mainly useful for industrial

purposes but a small proportion (about one-third) can be made into an excellent table oil. The pips are first extracted by machinery from the vine residues, preferably immediately after pressing for wine. In Switzerland two types of machinery are available each with an hourly production of about 11-1,200 kg. fresh pips. The pips are dried, losing about 40% of their weight in the process. They are then ground very small and are extractable under heat in a revolving cylinder. The ordinary oil presses such as are used for extracting poppy oil are useless. Roughly 100 kg. wine residues will yield 20 kg. fresh pips or 12 kg. dried pips and the pips themselves contain from 9% to 16% of oil according to district, variety and maturity, most of it being capable of extraction. The best yield is said to come from the Blauburgunder (Pinot noir) variety.

1547. PALENI, A. 634.8:633.85
Die industrielle Verwendung der Traubenkerne und des daraus gewonnenen Öles in Italien. (The industrial use of grape pips and of their oil in Italy.)

Fette u. Seifen, 1941, 48: 283-6, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 31.
Grape oil is extracted with petrol ether from the pips, giving a yield varying from 8% to 16%. It resembles linseed oil. The extraction of the valuable tomato seed oil has also been started in Italy.

1548. FUNCK, E. 634.38:633.85

Über Maulbeersamenöl. (Mulberry seed oil.) *Gartenbauwiss.*, 1941, 16: 371-2, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 95.
Mulberry seeds are found to contain an oil of nutty flavour. It amounts to about 36% of the seed content. The enzyme content varies with the season.

1549. PRÖGLER, R. 633.525.2:633.85
Das Brennnesselsamenöl. (Nettle seed oil.) *Fette u. Seifen*, 1941, 48: 540-1, from abstract *Forschungsdienst*, 1942, Vol. 13, abstr. p. 95.

Breeding work by Bredemann has resulted in an increased fibre content in the nettle which now amounts to 14%. The oil content of the seeds is about 32%. It solidifies at -23°, is of a greenish yellow colour and has a pleasant smell resembling that of carrots. Its taste is good. As regards its drying qualities it is intermediate between poppy and hemp oil.

1550. PRIE, N. W. 581.144.4:613.2
Some practical aspects of leaf protein manufacture. *Food Manuf.*, 1942, 17: 283-6, bibl. 10.

Assuming that there is a *prima facie* case for the preparation of leaf protein, three problems arise, namely, (1) the crops to be used, (2) the machinery for maceration and (3) the final treatment of the crude protein to make it palatable. The author considers that (1) and (3) present little difficulty but that (2) is fundamental since there is little beyond laboratory experience to go on and processes appearing easy in the laboratory may prove difficult when such intractable material as large masses of minced leaves has to be dealt with. In this paper are discussed the composition and protein content of leaves, the separation of leaf components, the effects of maceration and the distribution of protein. It is proposed to grow forage crops which would be separated into as large a yield as possible of leaf protein with a residue suitable for cattle feed. The residue would actually consist of the leaf fibre and two-thirds of the leaf protein. The uses and sources of leaf protein are discussed and the use of waste materials (e.g. potato haulms, sisal fibres) as a source of protein. The questions of supply and the estimated yields of various crops are examined.

1551. FABIAN, F. W., AND BLOOM, E. F. 634.11:663.813

The chloracetic acids as preservatives for apple juice.

Fruit Prod. J., 1942, 21: 292-6, bibl. 9.

Monochloroacetic acid apparently has no superior preserving qualities over sodium benzoate and its use has now been prohibited by law in the U.S.A.

1552. AITKEN, H. C. 663.813:634.11:577.16
Fortified apple juice. Notes on the addition of vitamin C (ascorbic acid). *Canad. Food Packer*, 1942, 13: 7: 20-1.

The article reviews briefly the results of the co-operative programme which provided Canada with vitamin C fortified apple juice. The method of fortification finally adopted is described.

1553. DOWNER, A. W. E. 663.813:634.3:577.16
The stability of ascorbic acid in citrus fruit juice products. *J. Soc. chem. Ind.*, 1942, 61: 80-2, bibl. 12.

It is shown that carbonated citrus fruit juice beverages can be successfully fortified with vitamin C (*L*-ascorbic acid). After 7 weeks, diluted, non-carbonated beverages retained only 5% of the original ascorbic acid content while carbonated beverages retained 66%. A slightly destructive effect of sulphur dioxide was noticed, but the loss was small compared to that caused by the growth of micro-organisms in untreated, acidified or pasteurized juices and in those juices containing too little of the preservative.

1554. BOYES, W. W., AND DE VILLIERS, D. J. R. 634.421:577.16

Vitamin C content of guavas.

Fmg S. Afr., 1942, 17: 319-36, bibl. 4.

The guava is shown to possess a very high vitamin C content which, unlike that of orange juice, remains stable and potent after canning. In addition the canned fruit is cheap and palatable. The vitamin C content depends greatly on type of guava, and as reported here was from 227 to 550 mgm. per 100 gm. of fruit, that of early season guavas being generally lower than that of late guavas. In South Africa, where the investigations reported were carried out, guavas are not yet classified into varieties. Five main types were, however, distinguished. Vitamin C content does not appear to be greatly affected by degree of maturity. The richest source of the vitamin is the peel and the lowest the inner flesh. The inner flesh could indeed well be discarded. Very little vitamin C was lost in stewing or in jelly and in the case of jelly loss during storage at 98° F. was slow. In concentrated guava extract vitamin C is lost very rapidly. Loss was also rapid from powdered guava stored at tropical temperatures in sealed bottles. Investigations are continuing at the Low Temperature Research Laboratory, Capetown.

1555. MACKINNEY, C., ARONOFF, S., AND BORNSTEIN, B. T. 635.1/7:577.16
Some assays of provitamin A carotenoids. *Industr. Engng Chem. (Analytical Edition)*, 1942, 14: 391-5, bibl. 25.

An endeavour is made to present the problem of provitamin A carotenoid determination in plant materials in broad perspective. Results on carrots, spinach, tomatoes, apricots, peaches and prunes are discussed, particularly with reference to preservation practices. The significance of the various findings is briefly evaluated in terms of bio-assay and nutrition. [From authors' summary.]

1556. JOHN, P. K. 678.11:633.912
Preservation of latex. *Plant. Chron.*, 1942, 37: 226-7.

In view of the cessation of supplies of preserved latex and of creamed latex from Malaya instructions in the preparation

of these are compiled for the benefit of rubber planters in India. The latex must be quite free of foreign matter. Preservation is most conveniently done by the addition of gaseous ammonia passed into the latex from a cylinder via a rubber hose and a distributor, the latter consisting of 4 perforated iron pipes set at right angles to each other in the horizontal plane and connected by means of a five-way union to the main feed pipe which is in the vertical plane. About 7.5 lb. of ammonia (=0.75%) per 100 gallons of latex is introduced at the rate of $\frac{1}{2}$ lb. per minute. A method for preparing a suitable ammonia solution as preservative or anti-coagulant for use in the field is to pass slowly 10 lb. of gas into 10 gallons of water and subsequently as required add the solution to the latex at the rate of 24 fluid oz. per 50 gallons of latex. The simplest way of producing creamed latex is to raise the ammonia content to 1.50% and add 0.3 by weight per 100 parts water in the latex of solution of carob-seed gum made by boiling 3 parts gum in 100 parts water. In practice 6 lb. of carob-seed or gum tragacanth boiled in 20 gallons of water will cream 300 gallons of 35% latex.

1557. CRASEMANN, E., AND TSCHERNIAK, A. 664.85.13.047: 631.563.5

Fütterungsversuche mit Birmentrockentrestern an Schweinen. (Pig feeding trials with waste from dried pears.) [French summary.]

Landw. Jb. Schweiz, 1942, 56: 387-412, bibl. 1.

Dried pear waste is compared with sugar beet leaves and barley offals and notes are given of the necessary changes in other foodstuffs which the use of dried pear waste demands.

1558. WILSON, W. K. 633.72: 636.92

Tea leaves as a maintenance food for animals.

Nature, 1942, 150: 199-201, bibl. 2.

The replacement of 10-20% of food concentrates by spent tea leaves (on the 4:1 basis) did not affect the bodily condition or subsequent fertility of rabbits at the Harper Adams Agricultural College. The feeding of tea leaves to rabbits is a practice of small-scale rabbit keepers but experimental evidence of their value has hitherto been scanty.

1559. BRAUDE, R., AND FOOT, A. S. 633.74-1.57

Cacao by-products in pig feeding: cocoa-cake meal and de-theobrominized cocoa-cake meal as feeding-stuffs for pigs.

Emp. J. exp. Agric., 1942, 10: 182-8.

Experiments to investigate the value of fat-extracted cocoa-cake as a substitute for a part of the cereal meal in the normal diet of pigs and to discover whether the feeding value could be increased by the commercial extraction of most of the theobromine are described. Untreated cocoa-cake could be fed successfully to pigs at 10% level if not introduced into the diet before they reach about 120 lb. liveweight. Extraction of the theobromine renders the meal harmless to younger pigs and it can then be fed to fattening pigs at the rate of 8%. Above this rate the growth of the pigs is liable to be retarded.

1560. ENGLIS, D. T., AND FIESS, H. A. 635.24-631.56

Production of a palatable artichoke syrup.

Application of organic exchangers.

Industr. Engng Chem. (Industrial Edition), 1942, 34: 864-7, bibl. 15.

NOTES ON BOOKS AND REPORTS.

1561. ASSOCIATION FOR THE STUDY OF SYSTEMATICS IN RELATION TO GENERAL BIOLOGY.*

016: 591.9+581.9

Bibliography of key works for the identification of the British fauna and flora.

Published by the Association and sold at Linnean Society, Burlington House, London, W.1, and Adlard & Son, Bartholomew Press, Dorking, 1942, pp. 105, 7s. 6d. post free.

This bibliography is the first publication of the Association for the Study of Systematics in Relation to General Biology. The Society was formed in 1937 and its aims will be found summarized on the outer cover. Briefly, the Association aspires to give the taxonomic complex of the British fauna and flora the thorough overhaul it badly needs; this includes an examination of the criteria employed, an investigation of the current methods of teaching systematics and the promotion of some sort of co-operation between the different branches of biology on problems of taxonomic interest. The Association also intends to produce a uniform series of [very necessary] handbooks on British fauna and flora. The Committee of the Association is a strong one and the work they have already done and have planned to do could hardly be of more importance in its sphere. Investigators, it was felt, were deterred from undertaking studies in many groups of plants and animals by lack of guidance as to the existing literature, and so it was one of the first acts of the Association to provide this carefully classified and annotated bibliography which, within its limits, should guide the aspirant into the way of truth. The limitation has to be noted for, as mentioned in the introduction, the lack of a comprehensive series of volumes on the fauna and flora of the British Isles is one of the biggest handicaps from which

the student suffers. The object of the bibliography is not to give long lists of references covering identical ground but to indicate where adequate information may be obtained. Thus in cases where well known groups have been thoroughly worked out in, say, two or three publications, lists of subsidiary papers are unnecessary. Birds, for instance, have 3 references only while flies, a less popular subject, have 38 and the Sea Pen, a creature represented in British waters by only 8 species, has collected 7 mentions. As a guide to the investigator looking for something to probe it is suggested that the longer the list of references the more does a group need study. It is hardly necessary to mention that such neglected groups are almost invariably troublesome in one way or another. This is certainly a work to place on the table of every scientific library. Readers will speedily discover its value.

1562. GARDNER, V. R. 634/635: 581

Basic horticulture.

Macmillan Co., New York, 1942, pp. 441, illustrated, \$3.75.

"In brief, the real objective should be to train the student to use his head, to think for himself, rather than just to remember." Thus the author in his preface. Acting on this principle he offers the student an account not so much of particular horticultural practices as of plant growth in general and of the natural habits, inclinations and growth tendencies on which horticultural practice is based. He shows that success in horticulture is based on the skillful use and adaptation of the natural impulses of the plant, and of its requirements as regards nutrients, light, temperature, etc., and how the practices of manuring, pruning, propagating, etc., should aim at fulfilling these requirements. He provides for the horticulturist rather what Percival offers to the agriculturist in his Agricultural Botany, and especially to the student with little or no grounding in botany or chemistry the book should be an ideal introduction to

* Hon. Treasurer, Dr. John Smart, Dept. Entomology, British Museum (Natural History), London, S.W.7. Annual subscription 5s.

horticulture. It should prove no less useful and interesting to those of more advanced knowledge.

Writing in a clear, easy style the author deals with the following subjects:—classification of plants, agricultural, botanical and horticultural; plant structure and growth; specialized buds and stems; growth limiting factors, namely temperature, water, light and nutrients; translocation and utilization of water and nutrients; carbohydrates; growth and fruitfulness; flower bud formation; training; pruning; flowers, fruits and seeds; propagation, seminal and vegetative; plant pests and diseases and their control—in general terms; the culture of annuals, biennials and woody perennials.

In short, he deals very successfully with the salient facts which should be known to anyone intending to try his hand at any branch of horticulture under temperate or tropical conditions. The book should prove equally useful on both sides of the Atlantic and Pacific.

1563. HERTZMAN, N., NILSSON-LEISSNER, G., SCHWANBOM, N., AND ARONSON, L. 631.531
Lanbrukets fröodling. (Agricultural seed production.)
Nordisk Rotogravyr, Stockholm, 1940, pp. 285,
Kr. 2.75 sewn, Kr. 3.75 bound.

In the foreword it is stated that Sweden can be regarded to a great extent as self-supporting as far as seed production is concerned, and this applies particularly to various agricultural crops. The importance of this fact will be readily appreciated when it is borne in mind that Swedish strains give larger and more reliable yields than those of foreign origin. The book is divided into three parts. Part I deals *inter alia* with the development and extent of seed production in Sweden, the production of stock seed, isolation, field inspection, weed control, the seed law and measures for the promotion of seed production. More importance is now attached to strain and variety of seed and to the carrying out of seed production in the cultivation area best suited to the variety and strain. Greater attention is paid to the question of stock seed, which applies not only to roots, but also to grasses, clovers and vegetables. The crops must be analysed at the Seed Testing Station and the seed sold in State-sealed condition.

In rational seed production there must now be required in the first place controlled cultivation of stock seed to be assured of genuineness of variety and strain, and in the second place careful inspection of the seed field. It is of the greatest importance that these measures are carried out by thoroughly competent persons, and the most complete control obtained by means of State sealing with a controlled cultivation certificate; this work is carried out by the Central Seed Testing Station.

Part II includes sections in which a description is given of the methods employed in the production of root crops and vegetables: beet (sugar beet, fodder beet, fodder sugar beet), swedes, turnips, fodder carrots; dwarf field beans, broad beans, peas, spinach, radish, dill, cucumber, cabbage, red beet, carrots, parsnips and parsley. Detailed information is given regarding soil, place in rotation, manuring, isolation, sowing, management during the growing period, attack by plant diseases and animal pests; notes on the different varieties and strains are also included. Sweden can herself meet her seed requirements of all the more important vegetables with the exception of onion and lettuce. Part III deals with the treatment of the harvested product—analysis and drying, cleaning, storing and sale of seed.

1564. LAURIE, A., AND RIES, V. H. 635.9
Floriculture.
McGraw-Hill, New York and London, 1942,
pp. 496, 28s.

In these utility days it is cheering to meet with a solid scientific horticultural text book dealing entirely and

unashamedly with plants of which the products are destined neither to be consumed nor processed but to serve no other purpose than to delight the eye of man. This book is written with the object of providing precise basic information on the many crops and phases of ornamental gardening and of presenting it briefly and scientifically. Horticulturists in U.S.A., for whom the book is made, have to cope with extremes of heat and cold that impose limitations, even in favoured States, unknown in Great Britain. The list of rock plants noted as difficult to grow, for instance contains plants which over here are wheeled away in barrow loads at every autumn clean up; delphiniums have to be treated as biennials and hybrid tea roses in many parts have to be wintered a foot deep in coverings of earth and straw. The grumbling gardeners of Great Britain have more to be thankful for than they realize. The first part of the book is concerned with general principles, including a little physiology and a good deal on the more practical side such as soils, fertilizers, soilless culture, management of frames and hot beds, garden design and propagation. In the discussion on this last item the over-optimistic claims made by vendors of synthetic growth substances come in for some severe debunking. Synthetic growth substances have no effect at all on the cuttings of a large number of plants; there are scarcely any really difficult plants that root the more readily for treatment with even the best growth substances; many plants that root easily do not do so any the more quickly for treatment; hard wooded cuttings are always unaffected; the growth substances are inoperative when the temperature of the rooting medium is under 65° F. or thereabouts, so that autumn or winter use is merely wasteful; the pH of the rooting medium should probably be either neutral or acid. However, the picture is not all dark. Growth substances *may* hasten the formation and increase the number of roots on cuttings that normally will root quite well anyhow and thus the period of critical attention needed will be reduced; sometimes, too, an improvement of the water relations seemingly brought about by the growth substances may keep cuttings turgid which would otherwise wilt. That other hare, in whose pursuit the American public has vainly parted with a good many dollars, the so-called soilless culture, is scotched but not quite killed, since the authors feel that given proper equipment and methods real possibilities may lie in that section of it known as "gravel culture" if conducted under glass. Accordingly after a brief warning of the fools and angels pattern the subject is explained and illustrated in detail. The remaining chapters deal chiefly with the various classes of plants and their cultivation. Each ends with a list of recommended kinds, confined, except in the case of roses, mainly to species. Horticultural forms are wisely omitted. Improved or at least new varieties appear with every issue of a nurseryman's catalogue and the advice of an authoritative work such as this, likely to stand for many years, should not date. There are useful chapters on the formation and upkeep of lawns, the control of pests and diseases, while most chapters conclude with a bibliography to assist those readers who wish to specialize.

1565. NICHOLSON, H. H. 631.62
The principles of field drainage.
Cambridge University Press, Cambridge, 1942,
pp. 165, 12s. 6d.

The author, who is lecturer in agricultural chemistry at the School of Agriculture, Cambridge, has made a speciality of drainage problems, and his book fills a long-felt need for an authoritative guide on this subject.

Beginning with a survey of the widespread need for drainage of fields, especially on heavy land, the author explains the principles underlying the formation of water tables and wet areas. He makes the important point that clay land, being impervious, differs fundamentally from pervious soils. In the latter, free water movement can take place to great depths; thus a single pipe line may drain a relatively wide

area, and the deeper the drains are laid the more the water table is lowered. But in clay land free water movement can occur only in the cultivated layer, the depth of the drains below this is therefore of little account, except to protect the pipes; and the drains must be closely spaced, for the shallow cultivated layer can quickly become waterlogged. Going on to practical aspects he points out the value of large-scale maps, especially in conjunction with geological maps, in spotting areas most likely to need draining and in planning the best layout. Well planned systems are more economical than rule-of-thumb draining. The importance of making permanent records of drains is also stressed: maps of all drainage schemes now undertaken with the aid of government grants must be deposited with the County authorities.

Ditches and their proper upkeep are matters of primary importance. In fact when neglected ditches are properly cleared out old drainage systems often begin to work again and further expense is unnecessary. Tile draining is fully described, together with layout and construction of mains and outfalls.

A particularly valuable section is that on mole draining. This operation is only suitable for clay soils, and mole drains only last well where the clay is relatively free from sand and gravel, but within these limits moling offers a rapid, cheap and efficient drainage method. Mole mains may be used, but tiled mains are generally better. These should be laid below the mole minors, so that the moles may be re-drawn after a period of years while the mains need not be disturbed. Mole-draining should, in fact, be regarded as a regular periodical tillage operation. Drawing the moles straight from the ditches is not recommended. Mole ploughs drawn by heavy tractors form a valuable supplement to the older steam tackle. An average spacing for mole drains is 3 to 5 yds., with a depth of 20 to 24 inches.

On the research side, while great advances have been made, it is clear that drainage research has not yet received the full attention it deserves. Drainage experiments are difficult and expensive, but new self-recording drain-flow meters offer the prospect of valuable progress.

The important effect of herbage on moisture usage is inadequately recognized in this book, in fact the author's statement that "A good cover of vegetation always . . . tends to keep the soil below it more moist, in spite of the amount removed by the transpiration of the crop itself" (p. 21) is certainly incorrect as a general statement. Moreover the coherence of the book is weakened by the fact that quite large sections are taken from previous papers by the author. This results in some disjointedness and repetition; but doubtless shortage of time is the reason. The reprinting, as an appendix, of the particulars of government assistance for drainage work—in most cases up to 50% of the total cost—is useful. There are also excellent tables of drainage constants and data. Sections on drainage of aerodromes, sports grounds and fortifications, and a discussion on the effect of field drainage on river flows are included and a lively interest is maintained throughout the work. The particular problems of fruit land drainage are not mentioned, but the general principles clearly apply.

This book should be in the hands of all concerned with land utilization and soil management. W.S.R.

1566. PERCIVAL, JOHN. 581: 633/635
Agricultural botany.
Duckworth, London, W.C.2 (8th edition, 2nd impression), 1942, pp. 839, 18s.

We have here a new impression of a book which in its different editions has been of immense help to the agricultural student for nearly half a century. Before its first issue in 1900 the student could consult treatises on agriculture and highly scientific works on botany but no work in which the interrelationship of the two was clearly and usefully shown.

In *Agricultural Botany* he finds the why and wherefore of innumerable common agricultural practices explained with the aid of simple, clear text figures and he is enabled to learn not so much the exact practice in particular cases as the basic facts of plant growth on which such practice must be based for best results.

As the result of a persistent demand there have been seven very careful revisions at different times, the last in 1936, in each of which the author has pruned, pared, amended and added in accordance with the findings of modern research, so that it still remains the standard English work for the agriculturist interested particularly in annual and biennial farm crops.*

The subject matter is dealt with under the following headings: External and internal morphology—how the different parts of a plant grow; physiology of nutrition and reproduction—how plants change, the practical significance of the Mendelian theory, vegetative reproduction; classification of farm plants—description of particular vegetable, cereal and forage plants in their different natural orders; weeds—and how to deal with them; farm seeds—general and special including standards of purity; fungi—common diseases and their control; bacteria—their work in the soil and a note on some diseases caused by them.

1567. WHITEHEAD, G. E. 634.1/8
Plain fruit growing for small families.
A. & C. Black, London, 1941, 7 × 4½, pp. 96, 3s.

This little book should have a wide appeal since everybody would like to produce useful crops without expending too much labour or money and it is this class that the book aspires to help. Because of its small size the information is necessarily more general than particular. Each fruit is taken in turn and brief notes are given as to its requirements and how to provide them. We are told when and with what to spray, when and how to prune, thin, feed, harvest, all in the fewest possible words, yet nothing essential is omitted and the style is bright and lucid. The non-specialist will find that the pages on pruning are masterpieces of condensation yet contain all that it is necessary for him to know, nor, after perusal, will he need to visit Harley Street to have the knots taken out of his brain. This, if he is at all acquainted with contemporary pruning literature, will surprise him. Though we were mildly pained to read that if Mr. Whitehead were planting a dozen apples in 6 varieties he would not include Cox's Orange Pippin and would not plant an apricot if he could find anything else, we have nothing but admiration for the rest of his dicta.

1568. WHITEHEAD, G. E. 633.8
Garden herbs. Culture: storage: uses.
A. & C. Black, London, 1942, 7 × 4½, pp. 84, 3s.

Mr. Whitehead is adept at saying much in few words while remaining entirely readable. For treatment here the herbs are grouped into "races", e.g. the sage race with 17 herbs, the parsley race with 13, tarragon 4, allium 7 and 7 unattached. That most of the garden herbs are contained within 4 botanical families is not generally realized (meaning the reviewer did not realize it) but then Mr. Whitehead is constantly producing facts one ought to know but doesn't. That is why there is always some excitement in reading him. Within the races the important herbs are dealt with first to give the novice some idea of what to select while the lesser follow in alphabetical order. Besides the routine information on cultivation and drying there is a fascinating chapter on the distilling of herbal essences at home. The latter subject is rarely dealt with in herb books but as described here it sounds so easy and the results so delectable that many will be unsatisfied till they have discovered by personal

* The horticulturist may now also consult V. R. Gardner's *Basic Horticulture*, Macmillan Co., N. York, 1942, pp. 441, illustrated, \$3.75; see abstract 1562.

experience where the snag lies. The book is rounded off with a herb gardener's calendar and a short bibliography.

1569. WOOLDRIDGE, W. R. 623.45: 613.2
War gases and foodstuffs.
 Food Manufacture, Leonard Hill, London, 1942,
 pp. 49, bibl. 18, 2s. 6d.

The use by the enemy of any of the war gases at present known can only prove effective if we are unprepared and do not know what protective action to take both before and after the event. In this country, after some years in which we were exhorted from every hoarding to carry our gas masks, we have now been told not to carry them, with the inevitable result that we incline to think all danger is past. The experts do not think all danger is past, far from it, and this practical book should be of great help to local authorities and others both as a reminder that we must be prepared to combat gas attacks and as a very helpful guide to the protection and decontamination of foodstuffs.

When it is considered that the actual proved effects of gas-contaminated foodstuffs upon the consumer (man or animal) range from the production of nausea or repugnance to the onset of an acute or chronic alimentary disturbance sometimes resulting in death, one's natural reluctance to make just one more effort against a problematical threat will perhaps subside.

The properties of the various types of likely gases are briefly discussed. Next the protection afforded to different foodstuffs against gas both in vapour and liquid form by the wrappers or containers normally used for such goods is considered. Notes are given on temporary protection of buildings containing livestock. The necessity is stressed for screening foods in bulk store in warehouses, institutes, etc., and generally protecting them from the effects of spray or vapour. The greater susceptibility of hay and similar fodder when loosely heaped than when tightly packed is noted. The factors affecting the degree of contamination are discussed. It is, however, inevitable that certain foodstuffs may become contaminated and the author discusses the following methods of salvage and their suitability under different circumstances:—aeration, washing, removal of outer layer, cooking, dilution by admixture, chemical treatment, weathering, combined methods. The salvage varies of course according to the gas, thus decontamination of foodstuffs from phosgene and the other lung irritants can frequently be achieved by aeration for 24-42 hours, whereas decontamination from one of the blister gases is generally considerably more difficult to achieve. The problem of water decontamination may arise, if the use of stagnant water becomes necessary, and suitable treatment is here detailed. As regards growing crops, serious harm on a large scale seems unlikely.

A chapter is devoted to the measures which local authorities may be forced to take in the event of contamination of foodstuffs by war gas, to the space and equipment desirable in decontamination buildings, while the decontamination of buildings themselves is also described. The detection and identification of the different gases, especially by chemical analysis, are considered and details are given of simple tests which should be very useful to the chemist who has not hitherto had to deal with such substances.

This book, written simply and clearly by an expert, should prove of great value, not only to chemical analysts and sanitary inspectors, but also to all concerned with the storage of food in wartime.

1570. ROYAL HORTICULTURAL SOCIETY. 635.1/7
The vegetable garden displayed.
 Royal Horticultural Society, Vincent Square,
 London, 4th impression, 1942, pp. 112, 2s. post free.

All the operations necessary for growing ordinary vegetables in the allotment are shown by photographs and concise notes. An eminently practical book.

1571. AGRICULTURAL RESEARCH COUNCIL, LONDON. 63(072)
Agricultural research in Great Britain.
 London, August, 1942, pp. 96.

Crop and animal husbandry research in Great Britain are fully covered in this recently published bulletin, which not only describes the organization of research but also outlines the work in progress at the different centres. Among research projects wholly or partly supported by the Council at a number of centres in each case the following are of particular interest to horticulturists:—Effect of minor mineral deficiencies on various crops; the use of sewage sludge, household refuse and composts therefrom as fertilizers; the breeding, cultivation, storage and processing of carrots; the control of wireworms.

The reader will find an adequate outline of research work on particular aspects of horticulture arranged under the different centres of research. Generally speaking he will look for particular subjects as follows:—*Beekeeping*, Rothamsted. *Crop improvement and seed testing*, National Institute of Agricultural Botany, Cambridge. *Fruitgrowing*, East Malling Research Station; Imperial College of Science and Technology, London; John Innes Institution; Long Ashton Research Station; West of Scotland Agricultural College, Glasgow. *Eelworms*, Institute of Agricultural Parasitology, St. Albans. *Fruit processing, cider, etc.*, Long Ashton Research Station. *Fruit (and vegetable) storage and preservation*, Low Temperature Research Station, Cambridge; Ditton Laboratory, East Malling; Dunn Nutritional Laboratory, Cambridge; Pest Infestation Laboratory, Slough. *Glasshouse crops*, Cheshunt Experimental and Research Station. *Hops*, S.E. Agricultural College, Wye. *Plant Physiology*, Imperial College of Science and Technology, London, and others. *Vegetable growing*, Woburn (Rothamsted); Scottish Society for Research in Plant Breeding, Edinburgh; Seale Hayne Agricultural College; Midland Agricultural College, Sutton Bonington; Edinburgh and East of Scotland Agricultural College; West of Scotland Agricultural College, Glasgow; Horticultural Research Station, Cambridge. *Virus*, Plant Virus Research Station, Cambridge; Scottish Society for Research in Plant Breeding, Corstorphine.

The list of contents is helpful but a subject index would have been even more so.

1572. U.S. DEPARTMENT OF AGRICULTURE. 63(7+8)
Agriculture in the Americas, issued monthly
 since January, 1941, Washington D.C., \$1.20 a
 year (foreign), 10 cents a copy.

This new issue by the Office of Foreign Agricultural Relations of the U.S. Department of Agriculture can be strongly recommended to all who are interested in the very numerous agricultural activities of the different States of the American continent. The well illustrated articles are indeed of a popular nature but they give much information which is valuable to the investigator. Among subjects recently discussed are the following:—the story of vanilla; quinine from the "fever-tree"; oils of Araby; America's drug plants; Go ahead guayule; Latin America's orchards; war speeds the rubber project [i.e. of establishing *Hevea brasiliensis* plantations in S. America].

1573. BARBADOS. 634/635
Annual Report of the Department of Science and Agriculture, Barbados, for the year ending March 1941, pp. 16.

The following notes of horticultural interest are taken from the report. The mangoes grafted at the Experimental Station for distribution to growers did not progress satisfactorily on leaving the care of the Department. On the other hand topworking of mangoes proved highly successful and this method of propagation is to be used in future. Varieties of vegetable seeds imported from U.S.A. were

tested against the standard varieties grown in the Island. *Stringless beans*. Idaho Refugee gave an outstanding yield and was resistant to mildew. *Lima beans*. Jackson Wonder outyielded all other varieties. *Beet*. Asgrow Wonder and Detroit Dark Red, seed imported from Associated Seed Growers, New Haven, Conn., outyielded Sutton's Globe, Detroit Dark Red being the best. Of carrots, cabbage and lettuce the standard varieties of the Island proved as good as or superior to the imported. Much of the report deals with sugar cane.

1574. CEYLON, TEA RESEARCH INSTITUTE. 633.72
Annual Report of the Tea Research Institute for 1941, 1942, being Bull. 23, pp. 81.

Pests and diseases of tea. Eelworm investigations indicate that *Anguillulina pratensis* might be starved out of the soil if no living plant were allowed to occupy it for at least 18 weeks. Large areas would have to be starved simultaneously to prevent reinfection. A comprehensive report on phloem necrosis is contributed by Dr. T. E. T. Bond. The entomologist contributes brief reports on the parasitizing of tea aphid by the fungus *Empusa* sp.; control of *Albizzia* butterflies, *Terias* spp.; recent unusual outbreaks of lobster caterpillar (*Stauropus alternus*); shot-hole borer investigations. *Agricultural chemistry*. Experiments are reported on green manuring and soil conditions, time of application of manure, tipping and plucking. *Plant Physiology*. Experiments on propagation by cuttings are reported. No difference in rooting was found between banjhi and growing shoots or between hessian and fern shade. All cuttings pretreated with sucrose and urea solutions gave slightly higher percentage of rooting than those treated with water. The most successful treatment consisted of standing the cuttings in 0.15% urea solution for 12, 18 or 24 hours, preferably the last. In a further experiment in which the above solution was compared for rooting effect with Hormotone A (1:320) and Hormotone A (1:300) + urea (0.15%), after 4 months none of the solutions had given any better results than water alone. Cuttings from some bushes always rooted more easily than cuttings from others. An estate experiment showed that cuttings when planted out grow at least as well as seedlings.

1575. CHESHUNT. 631.544
Twenty-seventh Annual Report of the Experimental and Research Station, Cheshunt, 1941, 1942, pp. 74, bibls.

The report contains amongst other matters observations on experimental results of 1941, advisory work in wartime, plant diseases, animal pests, chemical problems. *Tomato cultivation*. The many advantages of the application of wheat and oat straw to the soil in glasshouses so that it remains in almost vertical walls are restated. The straw is not a substitute for fertilizers. Three walls of straw instead of two to every two rows of tomato plants increased yield from 41 tons per acre to 47 tons. Application to a depth of 10 inches at the rate of 12 oz. of straw per foot run of soil wall seems to combine full efficiency with economy. No appreciable differences were revealed in the experiment of sulphate of potash versus muriate of potash, continued from last year. The results of some varietal trials with ordinary commercial varieties (a strain obtained by crossing Potentate with Kondine Red gave the highest yield, 47.65 tons per acre) and varieties reputed to be resistant to *Cladosporium fulvum* (leaf mould) are given. Vetomold in the latter class again proved its value, being quite immune and yielding 37 tons per acre approximately. A satisfactory method of growing tomatoes in cucumber and other small houses is described. Potentate often produces heavier crops in these conditions than in larger houses. A method of obtaining tomatoes from October to January is described. The plants sown in mid-May are grown out of doors in pots and brought under glass in September; the night temperature of the house is maintained at 50° F. Results of the national

trials of outdoor tomatoes are discussed and recommendations made. The heaviest crop was 36.6 tons per acre in Middlesex and the lowest 5.6 tons per acre in Cumberland, both from strain E.S.1. *Lettuce cultivation*. Cheshunt Early Giant again showed itself to be easily the most suitable lettuce for winter cultivation in heated glasshouses. The cold frame lettuce, Cheshunt Early Ball, is recommended for cold forcing and directions for its management are given. *Tomato virus diseases, etc.* Adequate liming of the soil investigated tended to delay symptom appearance of spotted wilt and to produce a proportion of plants not susceptible to artificial infection with the virus. Varying the potash levels had no effect. Stem stripes and streaks are rarely symptoms of a specific disease but may be due to at least 6 common virus diseases, water shortage in porous, well-fertilized soils, mineral deficiency, especially potash, unbalanced fertilizers, e.g. excess of potash or phosphate, high temperatures combined with low light intensity, bacterial infection (*B. lathyri*), toxic chemicals in the soil. Fruit losses associated with tomato mosaic infection are discussed. Careful attention to cultural condition will reduce losses due to early infection. *Pest control*. Tomato moth, red spider, wireworm, root-knot eelworm and other pests. *Soil treatment for wireworm control*. The chemicals used were carbon disulphide and formaldehyde-carbon disulphide. An unexplained absence of wireworms, dead or alive, rendered experiments unsatisfactory. It was shown, however, that formaldehyde applied at the standard rate recommended for soil sterilization did not give control of wireworm.

1576. EAST MALLING RESEARCH STATION. 634.1/7
Annual Report of the East Malling Research Station for 1941, A25, 1942, pp. 70.

The report contains four main sections, namely, (1) The experimental farm, (2) General review of research work with list of publications, (3) Research reports and (4) Bulletins for fruitgrowers. Separate abstracts are given of all articles in sections 3 and 4. The general review of research work is given under the following headings:—Pomology; Statistics and Records; Plant Physiology; Biochemistry; Plant Pathology, mycology and bacteriology; Entomology; Insecticides and fungicides; Hops including diseases and pests.

1577. INDIA, IMPERIAL COUNCIL OF AGRICULTURAL RESEARCH. 63
Agriculture and animal husbandry in India 1938-39, 1941, Manager of Publications, Delhi, pp. 422, 9s. 6d.

The report is divided into chapters, as follows:—Agricultural conditions. Economic work on crops—sixteen crops are dealt with. Recent developments in tobacco production and marketing. Composts and composting. Research in crop production. Agricultural marketing. Agricultural engineering. Two chapters on animal husbandry. Three chapters on various aspects of agricultural education. The co-operative movement as affecting agriculture. The remaining two chapters deal with publications and accounts respectively. There are 16 appendixes containing miscellaneous information, chiefly on administrative subjects. The reports on horticultural and plantation crops are summaries of the results obtained at various research stations in the country. These results have already been fully noticed in previous numbers of *Horticultural Abstracts*.

1578. NEW HAMPSHIRE. 633/635
Agricultural research in New Hampshire. Being Annual Reports of the Director of the New Hampshire Agricultural Experiment Station for 1938, 1939 and 1940.

Bulls. N. Hamp. agric. Exp. Stat. 313, 1939, pp. 34; 319, 1940, pp. 46; 330, 1941, pp. 42. Each of these reports contains introductory comment including Experiment Station news and general outlook

followed by short paragraphs in which accounts are given of the different projects and the indications or results yielded by them. A list of current station publications is included in each report and in the last a list of the published works of the late Dr. O. R. Butler, many of them on copper sprays. Among horticultural projects discussed are apple rootstocks, blueberries, apple storage, picking time and its relation to storage life in apples, strawberry studies, prevention of apple drop, potato growing.

1579. ORISSA. 633/634
Report of the Agricultural Department, Orissa, for 1939-40, 1942, pp. 73, Rs. 1-14-0.

Notes on experimental work pp. 16-24. *Citrus research.* A citrus fruit research scheme over a period of 3 years was sanctioned and the ground acquired for the purpose was laid out. *Potato.* Manurial trials indicated that ammonium sulphate, 4 maunds per acre, was superior to oil cakes and other organic manures. Of the oil cakes castor cake was superior to the others. Storage of seed tubers in ordinary storage resulted in considerable losses but even so in view of the price of seed at planting time it still seemed to be economical. The planting of very small tubers for economy reduced yield and quality. The planting of cut sections from large and medium size potatoes produced bigger crops and larger tubers. The resting period of the cut tubers had to be broken by chemical treatment of which immersion in 1% solution ethylene chlorhydrin for one hour gave the best germination. The high cost of this chemical caused further research and finally it was found that by steeping the cut tubers in water for 3 hours and washing them well at the end of every hour 90% germination could be obtained. The cut tubers must be kept damp and under cover for 24 hours to induce suberization of the cut surface. *Turmeric.* Manurial trials showed the need for ash and leaf mould. Analysis of turmeric soils and turmeric gave valuable information. Traditional local manurial practices were in general confirmed. *Orange.* Grafting orange on seedling bael (*Aegle marmelos*) has proved successful.* It is hoped that these grafts will do well on heavy clay and waterlogged soil. *Mango.* Seedlings 1 ft. high were obtained within a fortnight by planting the kernels of mango seeds in moist sand after extraction from the hard seed coat. *Clove.* The clove has been successfully grafted on to 4 other species of *Eugenia*. [This is probably the first record of a really successful attempt, though such combinations have been tried elsewhere. The species or method are not mentioned.—ED.] *Coconut.* Nuts to the number of 9,734 were purchased and sown for plant distribution. They were classified according to size, shape and colour. Results of this classification, if any, are not mentioned. *Various.* Trials and experimental work on the different government farms are reported briefly.

1580. QUEENSLAND ACCLIMATISATION SOCIETY. 634/635: 551.566.1
The Seventy-sixth Report of the Queensland Acclimatisation Society for 1941-42, Brisbane, 1942, pp. 12.

The year 1941/42 must have been one of the most trying in the history of the society. Not only was the weather marked by no rain of any consequence from July to December, but the war and all its consequences moved much closer to Queensland and the Society suffered the severe loss by death of its overseer. This occurred during the move to the new quarters, a farm of about 10 acres in the Redland Bay district, a locality noted as being one of the best fruit growing areas in Queensland. The transfer of trees and stocks took place under most unfavourable weather

conditions and considerable loss was sustained. The survivors are now firmly established and making good growth.

1581. ST. LUCIA. 634.337
Report on the Department of Agriculture, St. Lucia, B.W.I., 1941, 1942, pp. 12, 6d.

Investigations on the partial incompatibility of the West Indian lime with sour orange rootstock established a correlation with heavy scale insect attack. Consequently it is recommended that wild grapefruit stock be used instead. Attempts to infect with withertip the young roots of limes growing in glass pots in the laboratory failed. It was thought that the spores carried into the soil from infected shoots by rain might be partly responsible for the spread of the disease in the field. The remainder of the report deals with current agricultural progress and with marketing.

1582. TANGANYIKA TERRITORY. 633.73
Eighth Annual Report Coffee Research and Experimental Station, Lyamungu, Moshi, for 1941, 1942, pp. 10, 1s. 6d.

Some results obtained from experiments are as follows. The economic and agronomic values of mulch were confirmed. The use of banana trash for mulch saved 15s. per acre in cutlassing. Weeding was not necessary. Guinea grass came next in value as mulch while elephant grass was not very effective but showed promise of considerable manurial value. Sulphate of ammonia again enabled trees to bring to maturity a crop that would otherwise have turned to "buni". Planting experiments show that over a period of years the proper preparation of planting holes gives an adequate return for the trouble taken. "Subsoiling and compost had little effect. Complete failure resulted in the attempt to graft scions on to single-stem trees. Grafting on to suckers of multiple-stem trees is comparatively successful. Robusta and certain other types and varieties of coffee are useless as stocks for arabica. Artificial ground shading of coffee (as distinct from overhead shade) proved valuable in increasing yield as with citrus and cacao in Trinidad. Coffee planted in 1940 having banana mulch and receiving irrigation in dry months was three times the size of that in untreated plots.

1583. TUCUMAN (CROSS, W. E.). 633/635
Memoria anual del ano 1941. (Annual report of the Tucuman (Argentina) Experiment Station for 1941.)
Rev. industr. agric. Tucuman, 1942, 32: 7-113.

The report contains many contributions by the specialist officers of the station on the work of their departments. *Department of General Agriculture and Horticulture (E. F. Schultz).* *Medicinal plants.* The following are being experimentally grown with a view to determining their suitability for cultivation by smallholders, *Datura ferox*, *Ricinus communis*, *Cassia angustifolia* (senna), *Euonymus americanus*, *Rhamnus purshiana* (cascara), *Sassafras* sp. *Nux vomica*, *Hammamelis virginiana* (witch hazel), *Colchicum autumnale* and others. *Jute.* Provided water is available for retting jute can quite well be grown in Tucuman Province. *Potato.* Co-operative trials have shown the varieties White Rose, Katahdin and Green Mountain to be the most suitable for the potato districts of the province. Instructions are given as to the best methods of growing these sorts. *Citrus.* The oranges Hamlin and Parson Brown, though later than usual owing to abnormal weather, maintained their promise as being the best available early varieties. Navel oranges grow vigorously but are rarely productive in Tucuman. The newly introduced Robertson Navel appears likely to belie its reputation for shy bearing. Although it is desirable to keep the number of commercial citrus varieties grown as low as possible, the search for

* A statement in the report that this is "the first time on record" of the grafting of orange on *Aegle marmelos* is not quite correct. Cheema reports such graftings in *Bull. Bombay Dep. Agric.* 155 of 1928 on p. 44. Results, however, are not given.—ED.

superior sorts is maintained by co-operative trials of promising kinds. A table shows the results of deep and shallow planting experiments on unirrigated land [for results to May 1940, see *H.A.*, 12: 721.] As last year those (Ruby Blood on sour stock) with the collar 30 cm. below soil level gave the highest yields though one plant out of the 15 developed exanthema. Last year this (the deepest) group was the only one in which no plants were affected. Nevertheless at present, especially on irrigated land, growers should continue to plant with the collar 10 centimetres above soil level as a precaution against gummosis. Rootstock trials continue to confirm the general unsuitability of *Poncirus trifoliata* as a stock especially for Lue Gim Gong and Jaffa. Oranges cold stored at 2° C. developed skin blemishes within 30 days which, while not affecting flavour, render the fruit susceptible to fungus attack on withdrawal from store. Possibly the ventilation of the storage chamber is at fault. *Tung*. Provisionally selected high yielding trees (*Aleurites fordii*) have increased their lead in yield over the rest and numerous buddings taken from them are doing well. *Carpotroche brasiliensis*, source of an oil resembling the anti-leprosy specific chaulmoogra, is producing an excessive number of staminate flowers. It is hoped to correct this and to increase yield by budding. *Soybeans*. Adverse weather invalidated the trials. *Insecticidal plants*. Two plant species with insecticidal properties have been received from Peru under the name "Luaco" and "barbasco" respectively and propagated. The former is probably a *Lonchocarpus*, the latter is a leguminous plant of slower growth. Botanical identifications have not yet been made. *Tephrosia hookeriana* is also being experimentally grown. Other crops discussed are rice, forage, green manures and guayule. Reports are also included on plant diseases, pests and chemistry.

1584.

The following Annual Reports and other publications have also been examined:—

Fourteenth A.R. East African Agricultural Research Station, Arusi for 1941, 1942, pp. 6, H.M. Stationery Office, London, 3d.

DEPARTMENT OF AGRICULTURE, ASSAM (BARTHAKEUR, L.)

Rep. Tea Culture in Assam for the year 1940, 1942, pp. 13.

A.R. Edinburgh and East of Scotland Coll. Agric. for year ending 30 Sept. 1941, pp. 42.

Fifteenth A.R. agric. Res. Inst. N. Ireland, Hillsborough, Co. Down, 1941-42, 1942, pp. 22. Includes work on rate of seeding and diseases of flax.

A.R. Dep. Agric. Mauritius 1941, 1942, pp. 32, 45 cents.

A.R. Dep. Agric. Northern Rhodesia for 1941, 1942, pp. 6, 1s.

ROYAL METEOROLOGICAL SOCIETY.

The phenological report 1941.

Quart. J. roy. met. Soc., 1942, 68: 89-119, 3s.

Twelfth A.R. Sugarcane Res. Stat. Mauritius 1941, 1942, pp. 31, 40 cents.

A.R. Dep. Agric. Tanganyika Territory 1941, 1942, pp. 5, 6d.

TEXAS (JACKSON, A. D.).

Abstracts of Bulletins 596-609, Circulars 91-94 and other publications during 1941.

Circ. Tex. agric. Exp. Stat. 96, 1942, pp. 49.

A.R. Dep. Agric. Uganda Protect. for period 1 July, 1940, to 30 June, 1941, 1942, pp. 8, 1s.

VOL. XI. No. 1, Abs. 1-330 MARCH, 1941



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VOL. XI. No. 2, Abs. 331-650

JUNE, 1941



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VOL. XII. No. 3, Abs. 724-1164

SEPTEMBER 1942



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